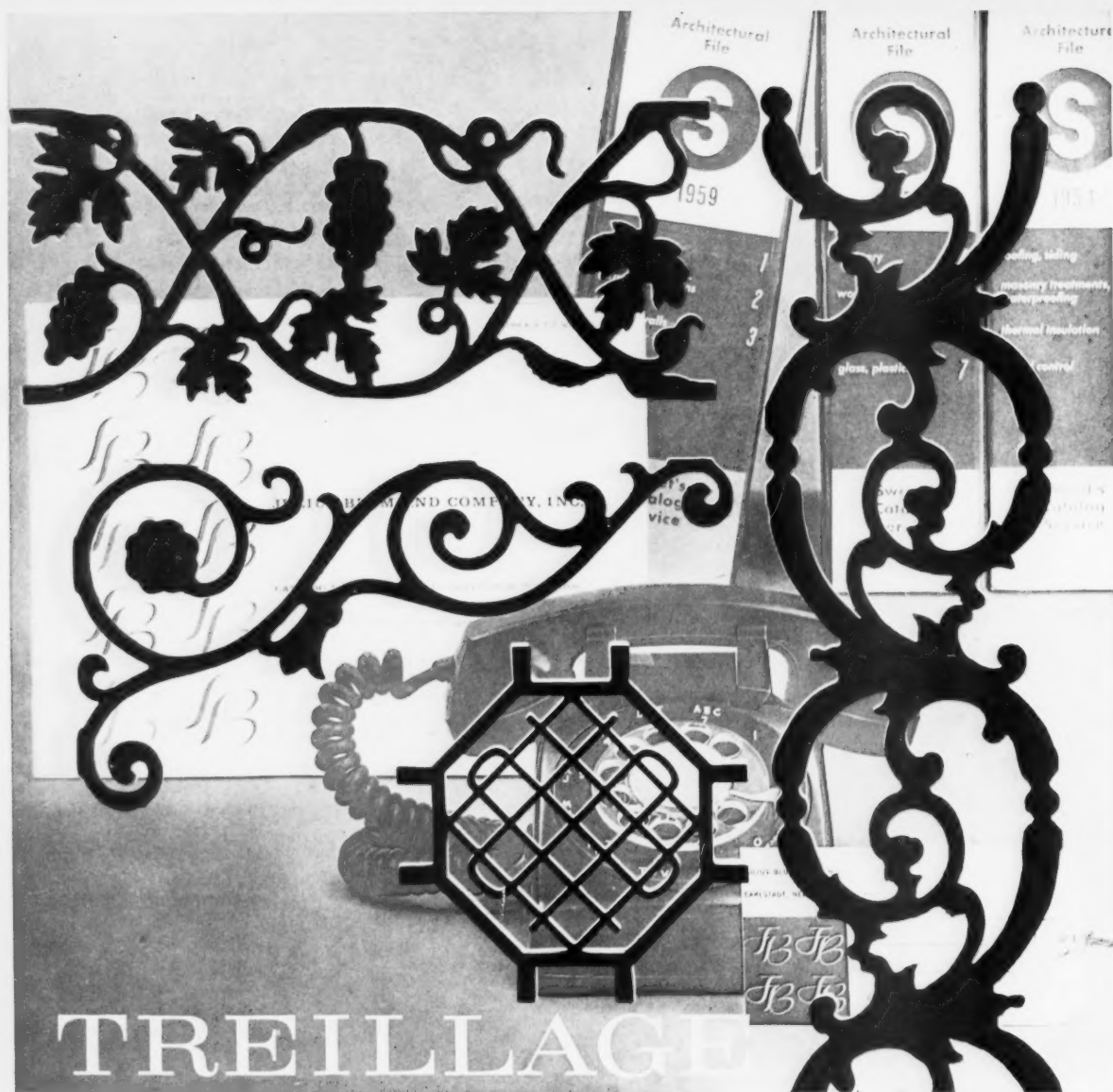


**ARCHITECTURAL & ENGINEERING**

# **N E W S**

**JUNE 1959 VOLUME ONE**



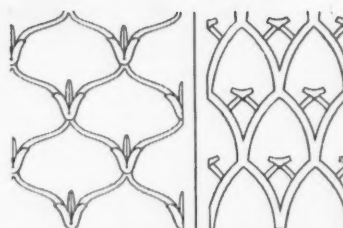


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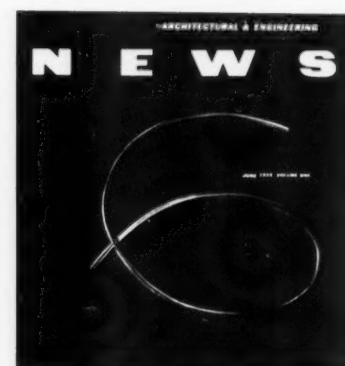
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TWO NEW CONTEMPORARY DESIGNS



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The cover of this issue symbolizes the application of metals to architectural engineering. Bob Gill was inspired to combine theme and issue numeral in one bent metal numeral six. Photo: Ronnie Rojas.



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# forecast

## METALS FACE THE FUTURE

*A/E NEWS presents a survey of opinion from authoritative spokesmen and researchers of the metal industry about the future of metals with special reference to its impact on building practices.*

### New metals

In the future, newer metals for new industries will have their impact on metal technology for the building industry. Demands are being made for metals capable of operating at higher temperatures and stresses, materials with greater corrosion resistance, with new or improved electrical properties over an extremely broad temperature range, according to the *Journal of Metals*. New metals that have achieved a high degree of purity with broad possibilities of application are titanium, columbium, molybdenum, chromium, zirconium, tantalum, vanadium and silicon.

To produce the newer metals and alloys and to fulfill the needs of new industries, entirely new technologies have had to be introduced into the metallurgical field. Prior to this, practically all the metals (with the exception of aluminum) were derived from their ores through a high-temperature smelting technique involving large furnaces with arcs or flames, complicated oxidizing and reducing steps and such operating problems as slag control and deoxidation. Manufacture of the new metals, however, involves a substantial amount of chemical processing. That is why one finds a combination of a metal and chemical producing corporation. New techniques include fluidized beds, purification and extraction columns, piping and valving of liquid metals, and are melting ingots of alloys in water-cooled molds. (source: *Journal of Metals*, May 1958.)

The Armour Research Foundation of the Illinois Institute of Technology reports a new process of metalworking, *fiber metallurgy*, which is expected to revolutionize products ranging from rocket nozzles to filters.

In the new process, thin fibers of metal are interlocked like a felt cloth and bonded together with heat to produce a material with reduced weight at little sacrifice of strength.

According to one of the developers, Dr. Robert H. Read, a finished fiber metal product may look, feel and in many ways, act like a solid metal sheet but actually be 90 per cent air. This high strength,

low-weight quality provides a variety of new uses that would employ a fiber metal network in conjunction with other materials: with plastics, for instance, to strengthen a good gasket material that is presently too weak for many applications; with other metals, to fabricate such things as stronger, non-sagging lead pipes; and with ceramics, in what is probably the most exciting new possibility, to make what might be called "reinforced concrete in miniature"—relatively light and almost unbelievably strong.

In Dr. Read's words, "New potential applications are being conceived far more rapidly than they can be tested and evaluated. The possible uses of fiber metals seem almost endless."

However, the large tonnage base alloys, such as iron, aluminum and copper are still the basic engineering metals of architecture.

### Steel production

According to Max D. Howell, Executive Vice-President of the *American Iron and Steel Institute*, "The uptrend in iron and steel production will continue during 1959. The new year's output of ingots and steel for castings will be 100 to 110 million net tons, barring unforeseen interruptions, compared with about 85 million tons during 1958, and 117 million tons in the record year 1955.

"Recent increases in the amount of iron and steel products being imported into the United States have been the cause of considerable concern especially in the Seaboard areas. The advantage of total exports over imports has steadily decreased, and the advantage has virtually disappeared in the case of certain individual products.

"Undaunted by the somewhat lower production rates, iron and steel companies have gone ahead with a wide variety of capital improvement programs. They are better equipped than ever before. Among the principal new projects, are rolling mills of various types and sizes, sintering plants, continuous annealing lines, research centers, another new oxygen steelmaking plant, as well as many other facilities. Steelmaking capacities have also been increased. As a result, the national steelmaking potential will probably rise to a record high annual level during 1959.

"During 1958, the iron and steel industry's technological progress went forward at a rapid rate in areas of practical value in the United States. Developments included: the growing use of self-fluxing sinter in blast furnaces; utilization of the vacuum casting process for quality steels; improved methods of beneficiating iron ores; progress in direct

reduction processes; increases in the output of steel by the oxygen process; the development of design information for steel structures; improvement of coking coal quality, and growth of continuous annealing of tin plate. Iron ore explorations were widened and new ore sources developed."

### Aluminum

E. C. Hartman of the Aluminum Company of America spoke of research in the aluminum industry in a recent address to the *Building Research Institute* at its 8th annual meeting in Pittsburgh:

"There are many lines of research already under way that will be continued into the 1960's, expanded and modified as needed to meet changing conditions, but aimed always at the future improvement of building practice . . . we are exerting constant effort toward improving the quality and diversity of aluminum products used in the building industry and toward making them more generally attractive. Long range programs are continuously under way in such fields as developing new alloys, creating new finishes, improving resistance to corrosion, and expanding design knowledge.

" . . . For over thirty years, such research has been underway covering all phases of the load-carrying capacity of aluminum members, with special attention to such problems as structural stability, fatigue, performance of joints and the development and improvement of design rules in general. The success or failure of many desirable building innovations will depend, in the future as in the past, on adequate attention to codes and design specifications.

"Any discussion of load carrying or structural features of building practice inevitably turns to stressed skin construction. Today most metal clad buildings are using the metal cladding either for simple decorative purposes or for combined decorative and curtain wall purposes. When one contemplates the load-carrying capacity of metal skins, one realizes the tremendous possibilities for economy in utilizing this potential strength to minimize or eliminate conventional structural framing. It calls for no fantastic stretches of imagination to visualize a metal clad building in which the primary loads are carried in the skin sheet without help from any supplementary structural frame. This combining of function can lead to real savings in building costs and in other advantages. One advantage would be the possibility of tremendous increases in rigidity and resistance to wind loadings. Thermal expansion and contraction problems could be eliminated by designing the skin sheets

to resist the thermal forces as well as the other more conventional forces. Bold, imaginative engineering will be required to make the most of stressed skin construction but our country has never lacked for this type of leadership. We in the aluminum industry are striving through research and development to provide in advance the types of materials that will be needed, in the proper forms, backed up by adequate technical information. "In emphasizing strength features, we do not intend to overlook the other desirable qualities of the aluminum alloys as building materials: lightweight, uniformity, pleasing appearance, resistance to corrosion, electrical conductivity, thermal conductivity, reflectivity and adaptability to almost unlimited attractive finishes. In fact, these other qualities will often serve to increase interest in the load carrying function. For example, the combination of strength with pleasing architectural finish is perhaps the greatest factor in promoting structural applications of aluminum in building construction and one that gives great freedom of expression to the architect and engineer. Similarly the combination of strength and resistance to corrosion plays its part. The compatibility of the aluminum alloys with many other materials will also come increasingly into play, for this characteristic makes it possible for them to be combined into units of great structural strength and stiffness, emphasizing the best qualities of each material, as in the case of sandwich panels, and self-supporting wind-resistant gridwork. Decorative screening and solar shades are examples of the types of application that will probably see wider use."

### Stainless steel

At the same 8th annual meeting of the *Building Research Institute*, Dr. L. C. Hicks, Director of Research and Development of the Allegheny Ludlum Steel Corporation, stated, "In the past few years we have all witnessed the greatly expanded use of stainless steel in building construction with particular regard to the outer surface of curtain walls and application to windows, window frames, doors, store fronts, etc. In order to speculate on the influences that current research activity may have on future applications of stainless steels for building construction, it would be helpful to analyze the reasons for its present use. Certain properties which are relatively unique with stainless steels make them a natural choice—their durability as reflected by their resistance to corrosion and abrasion, as well as their ability to present a pleasing appearance. The trend

(Continued on page 36)



Elliot Whitaker, Director of the School of Architecture at Ohio State University, and Noverre Musson, vice-president of the Columbus Chapter have been re-appointed to the Columbus Slum Clearance and Rehabilitation Commission.

Arthur O. Reddemann, AIA, past president of the Wisconsin Chapter, has been re-appointed to the Milwaukee Code Commission for a five-year term.

Jefferson D. Powell, AIA, of the Jacksonville Chapter was recently re-elected president of the City Planning Advisory Board of Jacksonville, Florida. The Board is composed of representatives of all civic organizations in the city and includes five architects.

Samuel E. Lunden, AIA, of the Southern California Chapter has been re-elected to the Board of Governors of Town Hall, a Los Angeles civic organization, after a four-year term as chairman of its Regional Planning and Development Section.

Ralph Walker, FAIA, has been appointed by President Eisenhower as a member of the *Fine Arts Commission* to succeed Wallace K. Harrison, FAIA. Two other architects, Douglas W. Orr and William G. Perry, were reappointed to the commission.

AIA President John Noble Richards, FAIA, has received an Honorary Corresponding Membership from the *Royal Architectural Institute of Canada* at the RAIC's Annual Assembly in Windsor, Ont.

## Office announcements

Chester Schiff, PE, has opened a new office at 150 W. 34th St., New York 1, N. Y.

Marshall J. Rouse, AIA, Milton Dubin, PE, and August F. Ventura, RA, announce their architectural and engineering practice to be known as Rouse, Dubin & Ventura, Architects-Engineers, 55 W. 42nd St., New York 36, N. Y.

Robert Rosenwasser, Consulting Engineer, to new address at 375 Fifth Ave., New York 16, N. Y.

Mackie & Roark, AIA, to 4725 Wyandotte St., Kansas City, Mo.

Morton H. Lerner, PE, to 1924 Chestnut St., Philadelphia 3, Pa.

A new firm, Ian Grad Associates, Consulting Engineers, announces the opening of offices at 114 E. 32nd St., New York 16, N.Y. Associated with the firm is Aaron Zicherman who, along with Ian Grad, recently resigned from Fred S. Dubin Associates, leaving positions as N.Y. Office Manager and Chief Engineer, respectively.

Victor M. Garcia, PE, has been appointed Associate in Charge of the San Juan, Puerto Rico office of Fred S. Dubin Associates, Consulting Engineers.

## SOME THINGS YOU SHOULD KNOW ABOUT

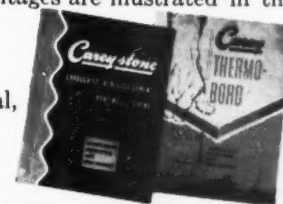
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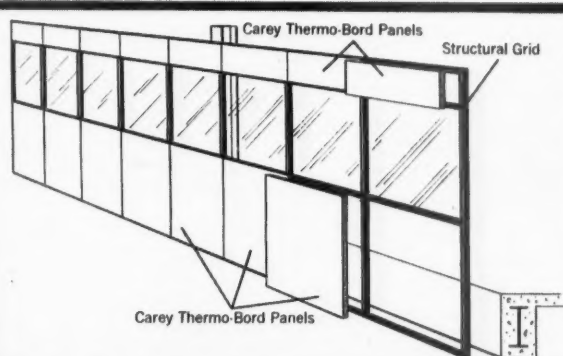
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- does not require heavy framing or foundations
- ideal for simple structures where insulation is not required
- resistant to practically all atmospheric conditions existing in industrial areas



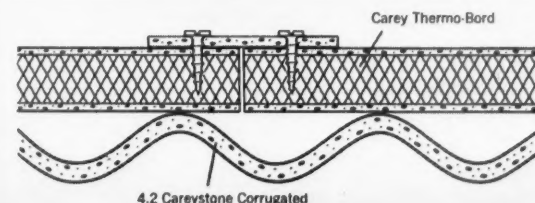
#### WINDOW-WALL CONSTRUCTION

- can be used with practically all types of window-wall designs
- used for schools, office buildings, commercial and industrial construction
- high insulation value
- deadens sound transmission through walls
- needs no surface finish but can be painted any color



#### THERMO-WALL CONSTRUCTION

- combines exterior and interior wall surfaces all in one
- has high insulating efficiency
- is quickly erected, requires no finishing
- can be used on all types of industrial buildings

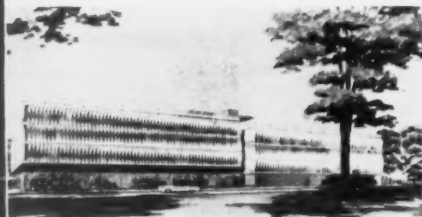


## Recreational facility

Long Island's first indoor-outdoor swimming pool project includes an Olympic size, 165-foot-long outdoor pool and a poolhouse for year-around activity. Poolhouse has a hyperbolic-paraboloid roof with peaks at four corners and one in the center. The project was designed for the Valley Stream Park Commission by Frederick P. Wiedersum Associates, Architects, with Guy Rothenstein, associate in charge of design.



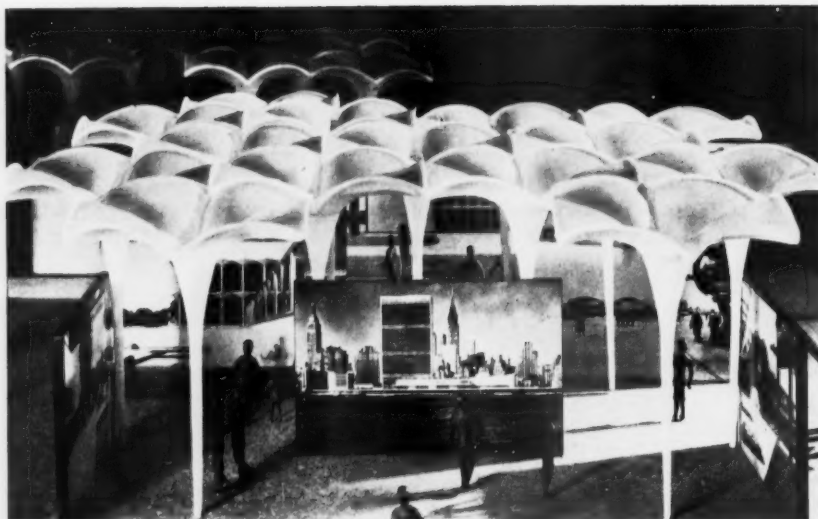
Recreational facility



Screened parking

## Screened parking facility

Ground was recently broken for a five-story self-parking structure for the staff of the Henry Ford Hospital in Detroit, Mich. Designed by Albert Kahn Associated Architects and Engineers, it will provide space for approximately 870 cars in a building which features an open-deck split level arrangement of floors connected by a series of short ramps, bridged at half levels. Parking is on each level. The structure also houses two passenger elevators together with three sets of stairs and includes ground floor facilities for servicing and car washing. The sculptural grille, which envelopes the upper floors of the building, marks a departure in the exterior treatment of open-deck parking structures. It is designed to screen the disorganized vehicular activity from view and offers a controlled attractive surface appropriate to its setting in an institutional-residential neighborhood. The screen is made up of some 1,800 doubly-curved, pure white precast concrete panels of hyperbolic-paraboloid shape which create unusual shadow patterns.



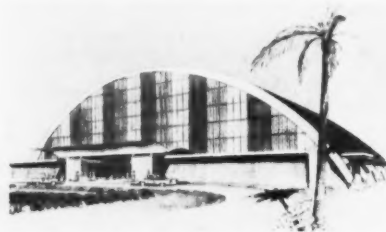
Model of U.S. architectural exhibit in Moscow

## U.S. exhibit in Moscow

A 360 degree panoramic view of New York City from a skyscraper at night and a photographic display of nearly 100 examples of American architecture will give Russians a picture of the way Americans live, work, worship and play when the American National Exhibition opens in Moscow July 25th. Vice-President Richard M. Nixon will attend the opening and officially dedicate the showing in the Soviet capital's Sokolniki Park. The exhibit, which will run six weeks, will present a comprehensive exhibition, with the United States Government, American industry and private institutions participating. A realistic image of America will be created through exhibits, displays, films, publications, fine arts and performing arts. By reciprocal agreement, the USSR will hold an exhibition in the Coliseum in New York City opening June 28. The architectural exhibit for showing in Moscow was designed and assembled for the United States Government by New York architects Peter Blake, AIA, and Julian Neski, AIA.

## Product symposium

Owens-Corning Fiberglas Corp. is currently sponsoring a series of architectural product development symposiums throughout the country. The first meeting was held March 31 and April 1 at Granville, Ohio. John Noble Richards, President of AIA, was one of the twelve central and southeastern architects who met with the company's product development team to study current products, processes and developments. Also included were discussions on new materials needed for contemporary building design.



A \$2 million Jai-Alai fronton for Daytona Beach, Fla., is scheduled for completion in June. Structure is framed by laminated wood arches and features a 300-unit reinforced polyester-plastic sandwich panel facade bonded to a system of extruded aluminum grids. Architect is Francis R. Walton of Daytona Beach.



Dallas center

## Dallas center

The recently dedicated \$35 million Southland Center in Dallas, Texas is the tallest building west of the Mississippi. The 42-story structure includes the 29 floor Sheraton-Dallas luxury hotel. Included in the project are five underground levels, a 2,500-car garage, shops, dining facilities and a roof top heliport. Architectural features are a glass mosaic curtain wall and end walls and sculptured base in inverted pyramid pattern of precast lightweight concrete with quartz aggregate. Welton Becket, FAIA, and Associates are Architects and Engineers with Mark Lemmon, Consulting Architect; Murray Erick Associates, Structural Engineers; Edwards & Hjorth, Consulting Structural Engineers; Zumwalt & Vinther, Consulting Mechanical Engineers.

## ASCE research grant

A new \$5,000 fellowship grant in the field of civil engineering research has been established by the American Society of Civil Engineers. Applicants must be members of ASCE, U.S. citizens, and have graduated from an accredited curriculum. In awarding the grant, preference will be given to research that is basic in nature and concept, rather than applied or developmental in character. Further information may be obtained from W. H. Wisely, Executive Secretary, ASCE, 33 West 39th St., New York 18, N.Y.

## AIA portfolio

The American Institute of Architects announces that the following awards will be made at the annual convention in June in New Orleans: *Gold Medal* to Walter Gropius; *Edward C. Kemper Award* to Bradley P. Kidder; *Honorary Membership* to Major General John S. Bragdon, Joseph Ehlers, Buckminster Fuller, and Henry R. Luce; *Honorary Fellowship* to Jean Canaux, Jacques Carlu, Jean Jacques Haffner, Basil Spence, and Luis Gonzalez Aparicio. In addition, 39 corporate members were selected for advancement to *Fellowship* in the Institute.

George McCue of the *St. Louis Post-Dispatch* and Frederick Gutheim, architectural critic and planner of Washington, D.C., writing for *Harper's* magazine, were winners of the twin \$500 first prizes in The American Institute of Architects' *Sixth Annual Journalism Award* competition.

A *School Safety Conference* brought together architect, educators, fire safety officials, school officials and building research specialists to discuss means of assuring fire safety in school buildings. The conference, initiated by the AIA, heard full reports on architectural safety problems, conflicting fire codes and regulations, and new developments in building research.

## Professional education

Presentation of the 1959 *Lloyd Warren Fellowship*, the 46th *Paris Prize in Architecture* was made by the Committee on Scholarships of the National Institute for Architectural Education at a special dinner in New York on May 12th. The successful scholar and winner of the coveted prize was Robert Frank Dannenbrink, Jr., of Washington University, St. Louis, Mo.

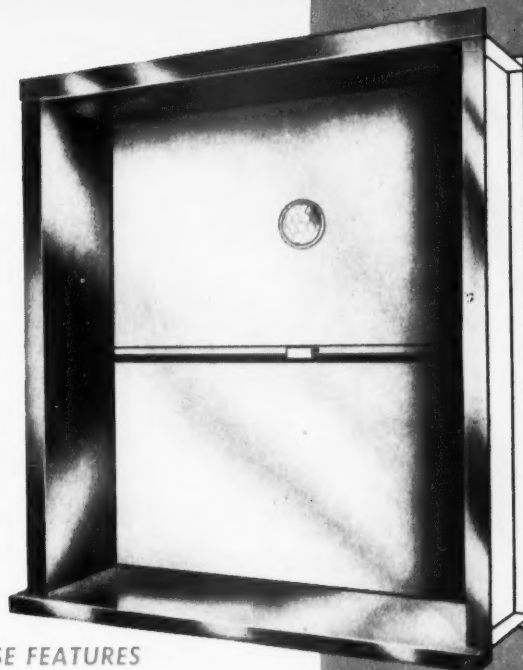
Readers of A/E NEWS are invited to attend the two-day session *Symposium on Education in Materials* jointly sponsored by the American Society for Engineering Education and the American Society for Testing Materials. The symposium will be held during the course of the 62nd ASTM Annual Meeting at the Chalfonte-Haddon Hall in Atlantic City, N. J., June 22nd.

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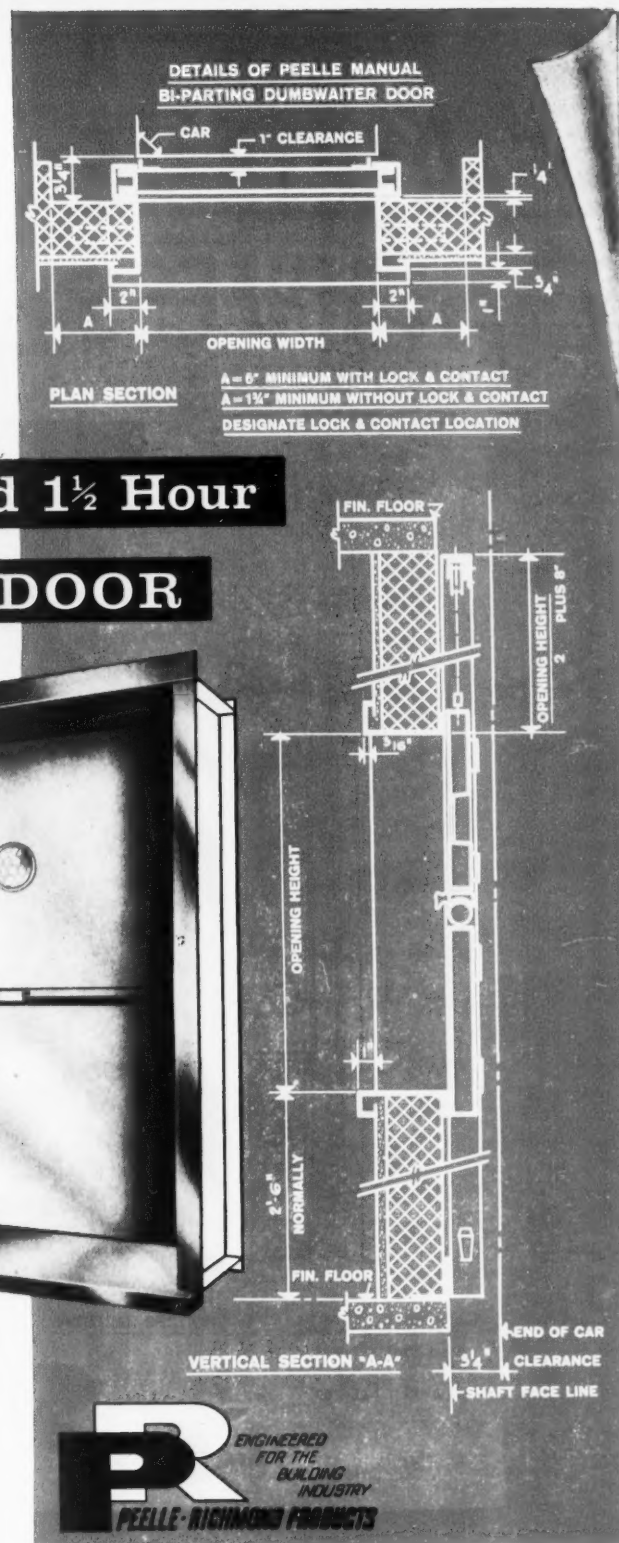
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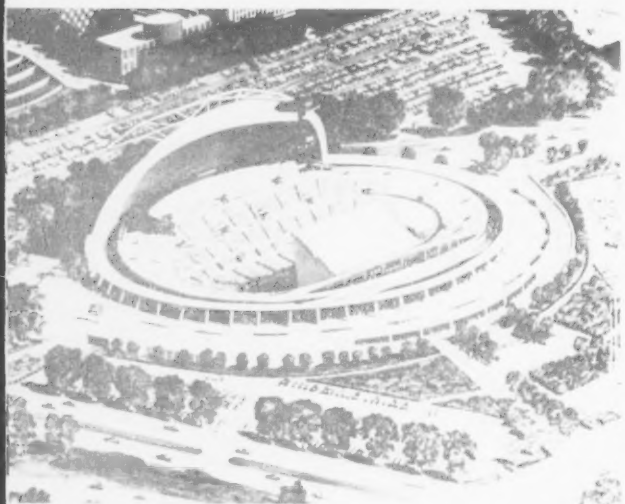
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# A RETRACTABLE STAINLESS



# STEEL DOME FOR PITTSBURGH

*A/E NEWS previews Pittsburgh's new auditorium. Scheduled for completion next year, the project features a 415-foot diameter stainless-steel sheathed retractable roof which is considered to be the largest retractable dome in the world.*

Pouring of foundation concrete is well under way on the unusual Pittsburgh Public Auditorium. This building is the key structure in Pittsburgh's Lower Hill redevelopment plan which will transform 95.4 acres of blighted area at the upper end of the famous Golden Triangle into a modern showplace of civic development. The Auditorium, including mall and parking area, will occupy about 20 acres. (*figure 1, left*), to provide the City of Pittsburgh and Allegheny County with a versatile civic arena capable of accommodating up to 13,600 spectators.

The unique feature of the auditorium is its vast stainless steel-sheathed retractable roof. The largest retractable dome in the world, the roof structure is nearly circular in plan—some 415 feet in diameter and 136 feet high at the center where it is just as tall as a twelve-story building. It is divided radially into eight, 45-degree sections, six movable and two stationary. When the roof is retracted, the six movable sections (three on each side) will glide one over the other on top of the two fixed sections to open the huge arena to the skies. It will take *two and one-half minutes* to move the roof sections from closed to open position.

The first such dome ever built, the mammoth movable roof makes possible a spectator open air stadium that can be converted to a weatherproof auditorium at the press of a button!

The auditorium will be constructed to house a wide range of facilities including a convention hall, an open air amphitheater, a sports arena, and an exhibit center. During the year, it is expected to play host to conventions, exhibits, business meetings, the Pittsburgh Civic Light Opera, musical shows, hockey, basketball, tennis, ice shows, rodeos, boxing, wrestling, water shows, political and civic meetings and many other events.

Among other features, the auditorium (which is scheduled for completion in spring 1961) will provide air conditioning, excellent acoustics, extensive stage accommodations, an ice rink, modern lighting, sound and visual effects and facilities for both radio and television broadcasts. Embodying an unusually adaptable seating plan, the structure will accommodate from 7,500 to 13,600 people depending on the event.

The Auditorium's planners, Architects Mitchell and Ritchey of Pittsburgh, have given special attention to a problem peculiar to modern urban development: parking. Three lots in the immediate vicinity of the building will provide approximately 1,700 parking spaces.

Estimated cost of the Auditorium is about \$20 million financed by a combination of private and public funds and a general fund-raising campaign.

## Planning features

While the dome of the Auditorium will rise above ground level as high as a twelve-story building, most of this altitude will be air space. The working floors of the structure will be three

in number. (*figure 2.*) Since the lot is graded, there are entrances on both the first and second levels.

The lowest level of the Auditorium will contain 50,000 square feet of permanent exhibit area. This space can be expanded to 89,000 square feet by opening sliding doors to incorporate the arena itself (132 feet by 240 feet) for many industrial exhibits, educational and scientific expositions, trade shows and merchandising fairs.

This lowest level will house locker and dressing rooms, two meeting rooms adjacent to the exhibit area, the main mechanical room, storage for concessions and space for maintenance supplies and equipment.

The second level will contain the main entrances and box offices, the office of the Authority and the Civic Light Opera and offices for other promoters. On the west side there will be three meeting rooms seating 350, 600 and 350 persons respectively. By removing the partitions between these rooms, a large room with a capacity of 1,200 persons can be created.

The top level of the structure will have seats on the west side and seats and control booth on the east side. The control booth will house the controls, boards and operators for the roof mechanism. It will also contain the controls for the Auditorium lighting and sound systems.

## Stage and seating

The stage of the Auditorium will be set on a separate level, beneath a section of the arena's permanent seats. When the stage is to be used, the entire section of seats is to be raised hydraulically. The bottom of this section will form the roof and proscenium arch for the stage.

The auditorium will have 9,280 permanent seats. However, it will be able to accommodate close to 14,000 people, depending on the event being conducted in the building.

For example, hockey matches will allow seating to be expanded to 10,500 seats; basketball games can have 11,900 spectators seated. If only a small dais in the center of the arena is required, for boxing or a political rally, for instance, seating can be expanded to 13,600.

An operatic performance, though, will cut seating capacity to 7,000, a total of 2,100 seats less than called for in the permanent seating plan. This is explained by the fact that some of the permanent seats will cover the stage area on which the performance would be given. When the 118 foot x 64 foot stage is to be used, the entire section of seats covering it can be raised hydraulically as a unit. The bottom of the raised section then serves as a fireproof proscenium from which curtains and other stage accoutrements can be hung.

## Press facilities

The press box will be located on the east side of the arena in the first tier of permanent fixed seats. Working tables are provided for 24 positions. Direct phone connections will be available,

along with Western Union and teletype connections. Radio broadcasters and TV announcers will also have space for microphone and equipment.

Adjacent to the north entrance to the arena there will be the developing and equipment room for press photographers.

### Exhibit area

The exhibit area on level one of the building provides a minimum of 50,000 square feet of completely equipped convention and trade show space. When the main Auditorium is not in use, the arena floor and stage area can add an additional 39,000 square feet all on one level, or a total of 89,000 square feet.

Floor load of the exhibit space is unlimited, except in certain areas. There the designated floor load is limited to 300 pounds per square foot, or the load permitted by the specifications in H20S16 of the American Assn. of State Highway Officials.

### Lighting

Special attention is being paid to systems for providing illumination inside the building. The stage will have its own spots, footlights and border lights, along with follow spots placed around the rim of the seating area. The arena will be equipped with 200 Thompson hangers located in the eight sections of the roof. The roof lamps will have a total of 528,000 watts. The system will provide from eighty to one hundred foot-candles of light concentrated over the arena floor. All the lighting is designed to avoid glare and will permit televising of events without the need of extra lighting.

### Sound system

The sound system, using the most modern equipment available, permits maximum use of Auditorium space, as separate units or in combination, for transmission and reception of broadcasts.

The total system is divided into sections servicing the following areas and functions:

1. Main Arena and Stage
2. Intercommunication
3. Meeting Rooms
4. Exhibit Area
5. Paging

By combining sections of the system, broadcasts from one area may be picked up in others, or transmitted outside. Simultaneous broadcasts to outside receivers may originate from several locations within the Auditorium building.

Plans include five permanent television camera sites and a TV monitoring room with outlets and

other facilities used for TV transmission. Duct space has been included in the plans to permit installation of color TV lines. The building will also be wired for closed-circuit TV programs.

### Other utilities/services

In the exhibit area on the first level there will be 32 bays with readily available electric power, hot and cold water, floor drains and waste outlets, compressed air, gas and steam.

120 volt single phase—Universal single-pole trolley duct (Maximum power—500 KVA).

208 volt, three phase—Industrial three-pole trolley duct (Maximum power—250 KVA).

208 volt, three phase—400 ampere plug-in duct (Maximum power—144 KVA).

All the above are integrally designed facilities. For special uses there will be an additional 300 KVA made available by installation of temporary leads.

Each bay will also have half-inch hot and cold water lines at city pressure. There will be four-inch gravity-type floor drains in each bay and a two-inch waste outlet at each wet column.

There will be a total of 32 half-inch outlets in the exhibit area with pressure at 100 pounds. This pressure may be increased at certain of the locations.

Two points in each bay will provide gas service throughout the exhibit area.

All of the public spaces in the auditorium will be air conditioned. The system is to be a high pressure combination heating, ventilating and air conditioning system. It is so designed that only the portion of the building in use will be serviced.

The main arena has a 900 horsepower compressor which has 800 tons of refrigerant capacity. The main exhibition area will be serviced with a 200-horsepower compressor with 167 tons of refrigerant capacity.

Two additional units, 78 horsepower and 20 horsepower, will cool and ventilate the remaining meeting rooms and offices.

A complete system of wet automatic sprinklers, manufactured in accordance with city and state codes and meeting standards of the National Board of Fire Underwriters, will be installed in all the stage, back stage, exhibit area, meeting rooms, storage areas and mechanical rooms.

A total of 39 fire alarms will be located throughout the building. When pulled, they send a coded signal through the master control panel to all alarm bells, and trip the city alarm box.

Although this building is possibly the most advanced structure in the country from point of design, it relies on old-fashioned lightning rods

for protection. Each of the movable roof sections will be separately grounded. The system will be completely concealed.

### General construction details

The reinforced concrete ring girder supporting the roof will encircle the building about 33 feet above the arena floor to make the over-all height of the Auditorium nearly 150 feet.

Girder width will be just under 20 feet except in the quarter supporting only the two outermost leaves. There it will be about 16 feet.

The upper surface of the girder will be banked 13 degrees from the horizontal toward the interior of the Auditorium. Reinforced concrete frames will be located around the perimeter every 7½ degrees (about 26 feet apart along the 197½ foot radius semicircles) to support the members.

*Steel in the construction:* A total of about 3,000 tons of various kinds of structural steel will be used in the Public Auditorium roof.

*Paint to be used:* All exposed surfaces in the structure, except the stainless steel sheath, certain other steel parts, non-ferrous metals and surfaces of pins, will be painted with three coats. There will be a primer coat, intermediate coat, and finish coat.

All inaccessible surfaces such as leaf ribs and parts of the cantilever frame will be painted with one additional finish coat. First coat will be red lead, iron oxide pigment in linseed oil. The intermediate coat will be red lead, iron oxide, linseed oil, synthetic varnish. The finish coat will be aluminum paint.

### Structural design of dome

*The dome,* sheathed in 20 and 22 gauge Type 302 stainless steel No. 2D special finish, is nearly circular in plan, measuring 403 feet one way and 417 feet the other. It is approximately 118 feet high above the ring girder on which the leaves move. The dome is divided radially into eight leaves. Two are stationary; six move about pins at the top as they roll along curved rails at the base. (figure 3.)

The six movable leaves differ slightly in size so that they may be nested. The leaves are hinged on stationary vertical pins at the crown and are mounted on wheels and steel tracks around the base. The leaves are designed to roll into the nested position like multiple-leaf rolling doors. When the leaves are fully stacked, three quarters of the dome is open to the sky.

Four of the six rolling leaves will be mounted on 12 wheels each—five intermediate two-wheel

(Continued on next page)

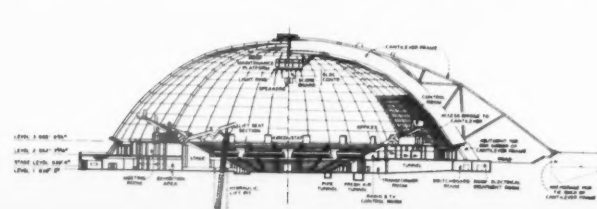


Figure 2. (left) Section through Auditorium. Cantilever frame is main support for building's dome-shaped roof when open. Novel arrangement of stage under a section of permanent seats is also shown. Figure 3. (right) Plan of retractable dome shows arrangement of fixed and movable leaves, along with location of box girder that is part of cantilever frame.



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trucks and two single-wheel trucks at the ends. On the other two (upper) rolling leaves (with five feet extensions) one of the end trucks will be of the two-wheel type. Individual electrical motors will power the drive wheels on each of the two-wheeled trucks.

The dome is designed as a batten roof. As the battens go toward the roof peak they taper in about six inches in every 15 feet. At the last fifty feet from the center, the dome sheath will be welded at the seams and a false batten cap will be used at the weld lines to preserve the batten appearance.

The cantilever frame which is the main support for the leaves is composed of a curved box girder approximately 8 feet wide, 17 feet 6 inches deep, with a system of tie-back members extending from the anchorage point near the ground line up to near the top of the box girder. Each leaf utilizes seven 30-inch rolled steel beams as ribs with 10-inch and 8-inch beam purlins. The outer face of the roof will be cellular metal decking covered with rigid insulation, felt, and the stainless steel. The underside of the framework is to be covered with a zinc coated baked enamel perforated steel ceiling. The cantilever box girder arm and tie truss weigh about 1400 tons.

Support for the dome: As noted above, the dome will have no interior supports. Rather, the leaves will rest on rails laid on a reinforced concrete ring girder. Pins of the crown will be supported by an exterior steel frame that cantilevers from outside the dome. The exterior steel frame that cantilevers terminates at the top of the dome in a ten foot cross member. Each end of the cross member is a multiple clevis and vertical pin to which four of the dome sections are connected. (figure 4.)

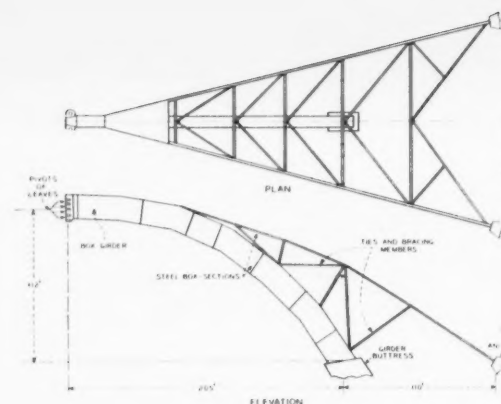
The distance between the clevises produces a ten foot separation between two semi-circular halves. This strip is roofed by 5 foot extensions of the upper leaves on either side.

The leaves of the dome: The two stationary leaves adjacent to the box girder form one quarter of the dome, and the exterior cantilever frame curves upward above the joint between them. These two leaves are the smallest of the eight. They are the innermost of the sections when the leaves are nested. The outer leaves which travel to the opposite side of the roof when it is closed, are nested on top of the intermediate leaves. (figure 3.)

Sheets of stainless steel 68 inches wide are to be fabricated into the sheath for the roof leaves. There will be approximately 166,000 square feet of stainless steel skin covering the dome.

Horizontally, the sheets will be lock seamed. Vertically, standard batten seams will be used to join the roofing sheets. The batten seams will allow for expansion and contraction of the roofing sheets with changes of temperature. This feature will help to keep the sheets from buckling on the roof.

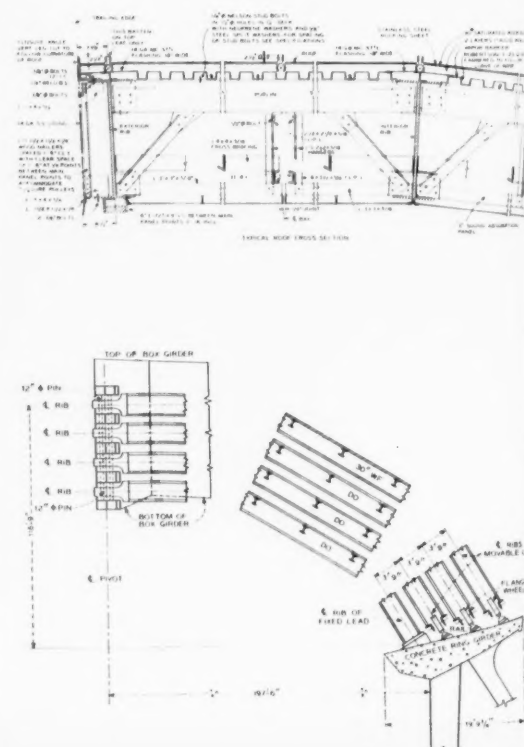
While the appearance of the complete dome will be spherical, each leaf will be constructed of six



## RETRACTABLE DOME

(Continued from page 7)

Figure 4. (above at top) Cantilever frame will support practically no dead load, but own weight when roof is closed. But sections, when retracted, will impose additional loads, with maximum when roof is completely open. Figure 5. (center) Typical cross section of roof shows outer face of cellular metal decking with rigid insulation, felt and Type 304 stainless steel. Underside of framework is to be covered with a zinc-coated baked enamel perforated steel ceiling. Figure 6. (bottom) Main ribs of roof leaves in profile in nested position form a pocket for cantilever frame's principal box member. Pins are one of two in roof structure for sets of roof leaves.





flat surfaces that describe chords of the sphere. The batten seams will extend from the circumference of the sphere to a point approximately 50 feet from its apex. There a welded false cap will be added to the roof structure with batten lines fabricated into it to preserve the appearance. Each of the six movable leaves will weigh about 300 tons.

All six movable leaves are to be provided with their own motors and brakes. The two top leaves will each have five 25-horsepower electric motors. The upper intermediate leaves will be equipped with five 20-horsepower electric motors each, and the two lower intermediate leaves will both have five 10-horsepower electric motors.

The top leaves, the pair that have the greatest amount of travel, will move at approximately four feet a second. This is faster than the average passenger elevator in an eight-story apartment house.

The design of the roof and its controls will permit it to be opened or closed in two minutes and 30 seconds against frictional and inertial forces and a wind force of 4,000 pounds (approximately 60 miles per hour).

**Forces in structure:** Horizontal reaction exerted by each roof leaf through the supporting pin at top of cantilever frame is 350,000 pounds. Maximum direct force exerted by each wheel at base of movable roof leaves normal to the supporting rail is 60,000 pounds when roof is closed; 35,000 pounds when roof leaf is moving. The following stress figures are of interest:

*Maximum tension at bottom*

*of each tie-back anchorage . 3,850,000 lbs.*

*Maximum thrust at bottom of*

*cantilever box girder ..... 7,210,000 lbs.*

**Closures for the leaves.** To provide water- and air-tight closures between the overlapping leaves of the dome, ingenious closure devices were designed. Two separate problems exist in designing the closures. The top leaves must butt together when the roof is closed; the intermediate leaves must overlap slightly, outer leaves on top of inner ones.

The seal at the butt-joint between the top leaves is a modern-day adaptation of the wood-worker's tongue-in-groove method of joining two lengths of wood. (figure 7).

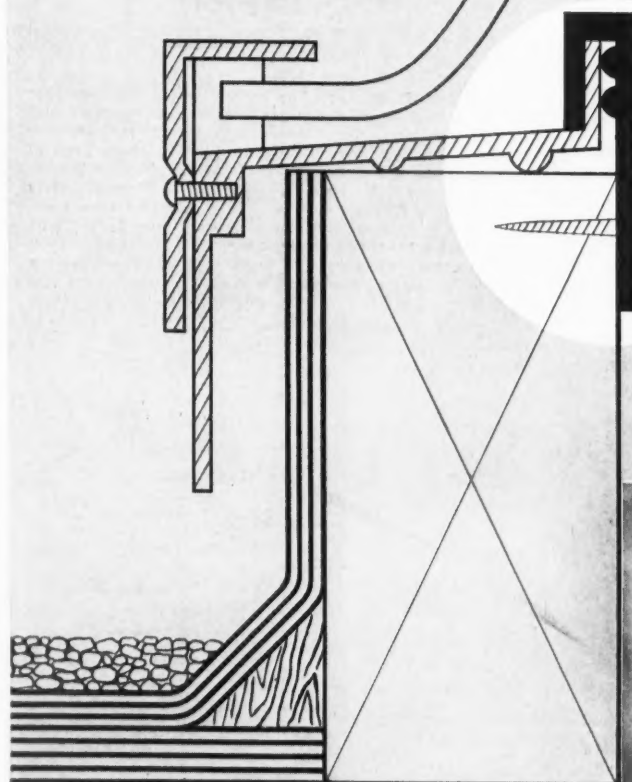
In this case, the tongue is a 1½ inch steel pipe running along the edge of one of the leaves. The groove is formed by two bulb-shaped strips of cotton-reinforced neoprene filled with foam rubber. As the two leaves come together, the pipe is forced between the pliable strips of foam rubber covered with neoprene, sealing the joint. At the same time stainless steel flashing on both of the leaves meets for a metal-to-metal joint that will permit only spatters of rain or snow inside. Whatever moisture does penetrate that joint will be retarded by the structure's waterproof tongue-in-groove, and drained off the sloping roof.

In the case of the other movable leaves, the problem is just as challenging, and was solved in

(Continued on next page)

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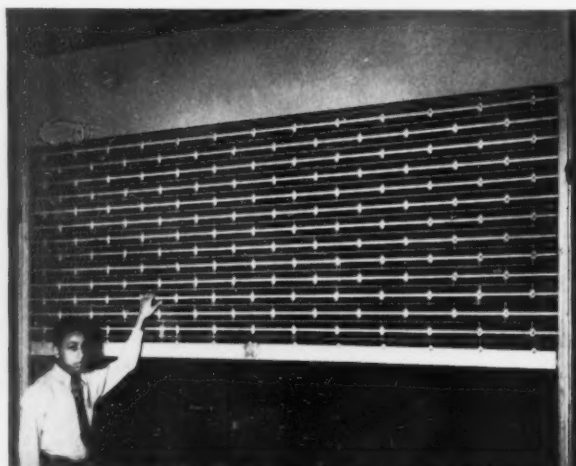


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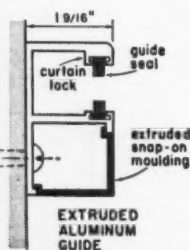
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## RETRACTABLE DOME

(Continued from page 9)

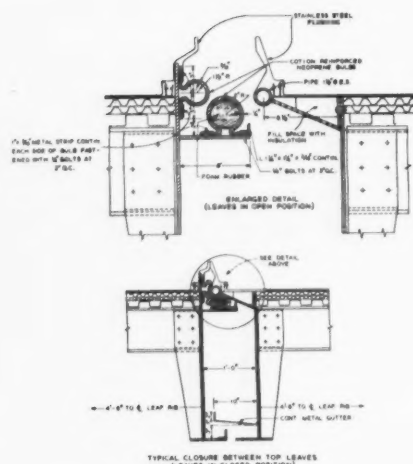
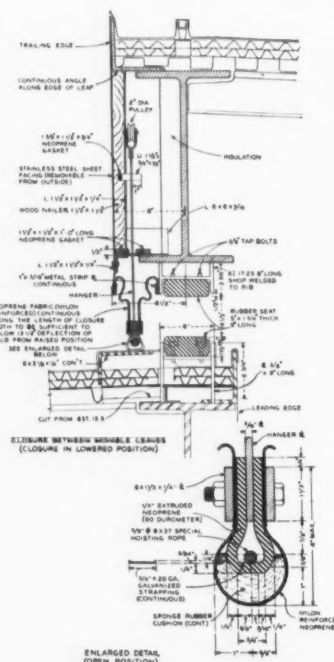


Figure 7. (at top) Top leaves, which butt together when roof is in closed position, are made water and air tight by an ingenious adaptation of woodworker's tongue-in-groove. Steel pipe running along edge of one leaf is pressed between pliable foam rubber strips when leaves are moved together. Stainless steel flashing prevents much rain and snow from splattering into closure. Figure 8. (bottom) Movable leaves do not butt together, but overlap each other. Neoprene (R) flaps, attached from the top leaf and held in place against lower leaf, seal opening from air and moisture.



a similarly ingenious manner. (figure 8).

These leaves do not butt together, but overlap approximately 14 inches. A neoprene fabric flap will be attached to the under edge of the top leaf. When the leaves come together, this flap will be lowered and held against the lower leaf by the automatic tensioning of a wire cable in a bulb. Springs return this bulb to a nested position when the roof begins to open. At the tip of the closure plate a sponge rubber bulb, covered with neoprene and fabric, will be pressed against the lower leaf to keep out air and moisture.

**Interior of the dome:** The metal panels forming the ceiling on the interior of the dome are steel with a baked enamel finish in color. They will be perforated to develop proper acoustic qualities. A three-inch acoustic blanket made of fiber glass will be placed behind the perforated ceiling panel. (figure 5.)

The interior metal panels and the acoustic blankets surrounding all the roof lights and along the cable and electric wire raceways will be removable to permit easy maintenance.

## Factors in material selection

This metal has a long record of superior service as a roofing material for public, institutional and industrial building. The first factory roof to be made of stainless corrugated sheets, for example, is still in service on the Pittsburgh Plate Glass plant in Creighton, Pa. It was originally installed in 1924, and has since withstood the effects of a highly corrosive industrial atmosphere.

The Chrysler building in New York City, for another example, was built in 1929 with its tower covering, grilles, gargoyles and decorative trim made of stainless. Despite exposure to a salt-water atmosphere and city fumes, the stainless steel work remains in perfect condition.

On the Pittsburgh Public Auditorium, stainless steel combines its advantages of durability and weather resistance with appearance that is attractively appropriate for a structure of such impressive scale and design.

Briefly, the advantages of stainless cited for application on the Auditorium are:

**Appearance:** a lasting attractiveness that gives the look of solid permanence to the building;

**Weather resistance:** stainless is not subject to atmospheric corrosion, and will not "bleed" or discolor in service;

**Strength:** thinner gauges of stainless can be used because of its higher strength/weight ratio. It can bear heavy loads of snow or rain water, and will not deflect excessively under strong winds;

**Maintenance ease:** stainless steel needs no painting, and cleaning is simple and inexpensive. In many cases natural washing with rain water is sufficient to maintain the appearance;

**Durability:** Stainless is stainless all the way through, and accidental scratches or scrapes on the surface will not cause deterioration.



## THE AMERICAN INSTITUTE OF ARCHITECTS

*"I have been struck with an observation of the young architect . . . in the case of the creative artist . . . it is clear that man is least permitted to appropriate himself what is most entirely his own. His works forsake him as the birds forsake the nest in which they were hatched.*

*"The fate of the Architect is the strangest of all in this way. How often he expends his whole soul, his whole heart and passion to produce buildings into which he may never enter . . . In the temple he draws a partition line between himself and the Holy of Holies; he may never set his foot upon the steps he has laid down for the heart-thrilling ceremonial, . . . and must not art in this way, step-by-step, draw off from the artist, when the work, like a child is provided for, has no more to fall back upon its father?" Goethe: Elective Affinities*

Goethe's observation, contained in the diary of young Ottilie, states the bitter-sweet delicate irony of the architect's function—the creation of the beautiful whose ultimate enjoyment is surrendered by its creator. This paradox may prevail today and this view is certainly open to question; however, we are inclined to believe that the architect creates for the pleasure of a much larger audience and not merely for his personal delight. He creates through a design consciousness—a process that begins with the inception of a program to a dramatic conclusion in a completed project.

Design, the planning of the beautiful, as an organizing force of human experience and as a professional discipline will always be part of architecture, come what may.

It is significant that the chosen theme of the 1959 AIA convention this year will be *design*. AIA President John Noble Richards, FAIA, in issuing the convention call, noted that design is *"the architect's unique contribution and monopoly and his first obligation to the public."*

We share this sentiment, because in an age in which automation and machine controls are substituted for the thinking of men, it is heartening to know that no one has developed—nor will ever—we confidently predict, a machine that will write or compose a sonata, a symphony, a poem or a work of architecture.

The architect's contribution is the creative shaping of environment. Today, he has many material and technological resources at his command; but the issue should never be confused. Technology alone, is not a substitute for a creative work or the mind or the heart.

The 1959 convention at New Orleans will present a galaxy of talented American architects. It may be said that this convention will provide a gathering place for a significant segment of the flower of American intellectual and artistic life which finds itself in the profession of architecture.

We may report with pride that the architect is continuously emerging as a unique force in American life wherein his profession has meaning not only to himself but to a growing responsive, interested public.

In the past, the AIA has struggled for the dignity of the individual architect and for professionalism in his practice. Howard Van Doren Shaw's famous admonition, *"be a gentleman if you can, but for God's sake be an architect!"* has

served as a gallant battle-cry in this splendid fight.

Today, the AIA looks back upon an 102-year history of memorable achievement; yet, this justifiable pride must not yield to complacency nor to self-satisfaction.

There is still a major educational effort to be made to the nation-at-large on *what, who and why* is an architect. This is not offered as an attitude of provincial self-preservation, but it is stated as a need for placing before the public, the responsibilities of the architect for maintaining this fair country's well-being and continued growth *beautifully*.

The immediate decade ahead offers fantastic opportunities for the renewal of our cities. The architect should not abdicate his legitimate role as a creative planner.

He, among all others, is the one professional who is most qualified to contribute to the humanistic development of our cities.

The AIA, as an organized body, is the prime-mover of the architect's responsibility and can speak for all on issues where it would be improper or imprudent for the individual practitioner.

The 1959 convention of the AIA at New Orleans is not an isolated event. Its statements, its deliberations, and its resolutions will be followed with interest by thoughtful people everywhere.

This convention holds the moral promise of the tomorrow of American architecture in its grasp. We are confident that its work will enhance the unity, the good conscience and the growth of the architectural profession. We wish the convention every success in its very important work. JJC





## UTILIZING ALUMINUM

by Paul E. Freeman, Chief Architectural Engineer of Alcoa, the Aluminum Company of America.

*Architectural effect, construction type, installation method, and the form of aluminum are four considerations given as selection factors in the application of aluminum to skeletal frame structures.*

### Criteria for selection

The selection of the particular *construction type* will be partially determined by the architectural effect desired and partly by the building's structural details. First of two distinct types of systems is the *facing type*. This is merely an application of aluminum skin covering up a back-up wall of conventional material.

A second and more popular type of construction is the *window wall or grid type*, which is recognized by the exposed grid, usually made up of extruded aluminum frames spanning the building framework. The horizontal and vertical members function as supplementary structural frames into which facing panels and windows or fixed glass are inserted. The frames and inserts are provided in various degrees of pre-assembly. The third criteria for selection of a curtain wall system is the *installation method*. Wall systems are installed by what might be termed a component method or a pre-assembled method, each achieving the same architectural effect. With *component method* all wall system components, such as panels, windows, mullions, sills, insulation and interior wall surfaces are applied piece-by-piece to the building framework in the field. This method offers versatility of design, but requires rather accurate location of parts in the field and excellent workmanship in order to achieve success. In addition, as might be expected, it is more costly and provides more opportunities for error.

The *pre-assembled method* is intended to refer to a complete floor height frame system with panel, and possibly windows, shop-assembled. Shop assembly proves more practical than field assembly, especially when many parts are involved. Potential joint problems may be reduced by welding or careful mechanical joining not always possible in the field. Since the panels can be carefully fabricated in the shop, a better job should result and economies can be obtained not possible utilizing the other types of construction.

The fourth and final criteria for choosing a curtain wall system is the form of aluminum to use. The decision to select aluminum extrusions, castings or sheet is dependent upon such factors as type of architectural effect sought, kind of finish desired, size of building, economy, and practicability of fabrication and erection. *Extruded shapes* may be applied as wall facing or further fabricated into panels of various kinds. Exceptionally long panels are especially suited to

this form of aluminum. Maximum practical length of an extrusion is about 24 feet. Practical widths of individual extruded sections vary up to 12 inches, although special widths up to 30 inches can be made.

*Sheet* may be applied as facing or used in pre-fabricated panels and window walls. It may be attached to an extruded panel framework or formed to make its own rigid frame. Because the thickness of sheet is governed primarily by strength requirements rather than fabricating limitations, aluminum sheet can have a thinner section and lighter weight than other forms of aluminum used in wall systems. This permits maximum wall coverage with a minimum amount of aluminum. Many architectural effects are possible with flat sheet, pressed or drawn sheet panels, and roll and brake-formed sheet panels.

Panels of *cast aluminum* are usually applied as spandrel facing. Castings offer specific design opportunities in both configuration and texture which are not otherwise obtainable. Costs are higher, however, than other forms of aluminum because the casting process requires a minimum thickness usually in excess of that required by sheet and extruded shapes.

### Design considerations

There are several design considerations to keep in mind when detailing and specifying aluminum:

1. *Structural requirements.* The only structural requirements of the normal curtain wall is to carry the wind load from floor-to-floor. The vertical mullions become the structural components which perform this function. Thus the wind loads are transferred from the panel and window units into the mullions and the mullion becomes a simple beam supported at each floor line fixed to the spandrel beam or fastened at the floor. The common deflection limitation is a ratio of clear span (or floor height)/175. Since aluminum has a modulus of elasticity of 10 million, the deflection limitation of  $L/175$  is normally more critical than stress and will no doubt be the design limitation. However, to check the stress in the member, a good rule to arrive at a working stress would be to take the average of the yield strength and ultimate strength divided by 2.4 and then increase it by 33 per cent, since wind loading is the only factor.

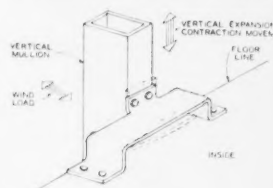
2. *Alloy and temper selection.* The alloy for aluminum panels is selected largely on the basis of the finished appearance desired. Prepared tables are available which are useful in selecting the alloy and temper needed. Commercial practice designates aluminum alloys by number. Cast aluminum alloys bear a two or three-digit number usually preceded by a letter which indicates an alloy modification. Wrought aluminum alloys bear a four-digit number system developed by the Aluminum Assn.

3. *Choice of thickness.* The thickness of all forms of aluminum used in wall panels is deter-

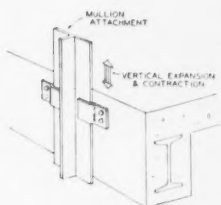
mined by either manufacturing techniques or structural requirements. With aluminum extrusions and castings, the minimum thickness required by manufacturing limitations is usually in excess of structural demands. The thickness of sheet is normally determined by the strength and stiffness necessary in the erected panel. Many variables make a consultation with an aluminum architectural representative advisable.

4. **Sound control.** The best way to stop sound, of course, is by use of mass. However, most wall systems have at least a 50 per cent glass area. This coupled with the cracks around operating sash units, has an appreciable effect of sound transmission. For these reasons, the small solid wall areas have little consequence in the over-all performance of the wall system. In general, cur-

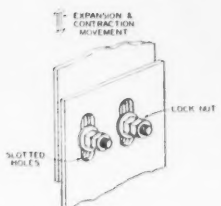
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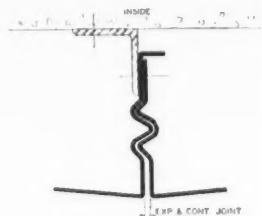
Detail 1



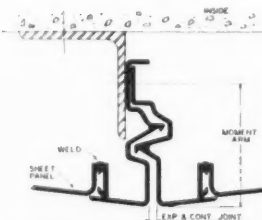
Detail 2



Detail 3



Detail 4



Detail 5

Details of connections and assemblies:  
Detail 1/anchor clip; Detail 2/clip arrangement; Detail 3/slotted holes; Detail 4/horizontal section at panel intersection; Detail 5/horizontal section at panel intersection.



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## UTILIZING ALUMINUM

(Continued from page 13)

tain wall construction adequately reduces street noises to an unobjectionable level. Room-to-room noises and floor-to-floor sound transmission can be minimized by closing all possible openings between the curtain wall and interior columns, floor slabs or spandrel beams, a feature sometimes overlooked by architects.

5. *Joint design.* The most important design consideration is the handling of the joints, since water tightness, expansion and contraction, as well as construction tolerances, are dependent on proper joint design. Aluminum has an expansion coefficient of .000013 per degree Fahrenheit per unit of length. This amounts to a change of about 5/32" per 10 feet of length per 100° F change in metal temperature. When considering weather tightness, the best designs are those that attempt to exclude entry of water at the outer surfaces, but yet provide an escape for any moisture that should penetrate the outer seals by weeping the panels at the sill. One very effective joint is one which provides several bends in the metal and does not depend upon sealants or gaskets. As water attempts to penetrate such a joint each change in direction can be designed to act as a capillary break and will cause a wind pressure drop permitting water to run downward to where it can be weeped out. At a joint between a split mullion and panel or between a sill and panel, an integral leg on the extrusion should be used on the inside surface as a positive water stop in case of moisture penetration of the sealant. The leg may overlap the panel as much as is practical when gasketing is employed. In a horizontal joint without gasketing, the inner leg should extend upward at least six inches. Joints between horizontal and vertical members can be very critical joints as far as water leakage is concerned. By using the pre-assembled method, welding or a combination of mechanical fastenings and sealants can be used to control moisture at this point. The best designed, of course, are those which do not have to depend on sealants or gaskets for water tightness, but this is not often possible.

6. *Anchorage.* Besides holding a curtain wall tight against a building frame, the means of anchorage must also permit adjustments to compensate for the building frame tolerance and allow for expansion and contraction of wall components. Because of different degrees of precision between factory-made curtain wall units and field erected structural frames, curtain wall anchors should allow for adjustment in three directions during erection. A 2-inch minimum clearance space between the panel and the building frame is advisable to permit attachments. The designer should bear in mind that with this 2-inch minimum clearance he can expect a plus or minus construction tolerance of the structural frame. The architect should make sure that this plus or minus tolerance is maintained in the building structure, if he expects a good curtain wall in-

stallation. Expansion and contraction can be compensated for by clips which are rigid in one direction but permit limited springing of sliding action in another direction. As a rule of thumb, where slotted holes are used, nuts should be tightened snugly, then backed off a half to three-quarters of a turn to allow free movement of adjacent parts. Lock nuts should be employed to prevent subsequent loosening. Shoulder bolts and cleaves can also be used.

7. *Erection.* To avoid scaffolding costs, curtain wall systems should be designed for installation from the inside of the building, particularly in structures higher than three or four stories. To hold field assembly to a minimum, wall systems should be designed to utilize shop fabrication as far as possible. Careful welding and mechanical joining of parts in the factory can eliminate many joint problems in the field.

8. *Provision for dissimilar materials.* Although aluminum by itself is remarkably corrosion resistant, contact with certain dissimilar materials in the presence of moisture can cause corrosion of the aluminum. Proper protective measures are both numerous and simple.

(a) Aluminum to dissimilar metals—where aluminum surfaces come in contact with metals other than stainless steel, zinc, white bronze of small area or other metals compatible with aluminum, keep aluminum surfaces from direct contact with such parts by: (1) painting the dissimilar metal with a prime coat of zinc-chromate primer or other suitable primer, followed by one or two coats of aluminum metal-and-masonry paint or other suitable protective coating, excluding those containing lead pigmentation; (2) painting the dissimilar metal with a coating of heavy-bodied bituminous paint; (3) a good quality caulking placed between aluminum and dissimilar metal; or (4) a nonabsorptive tape or gasket. Steel anchors and connecting members may be hot-dip galvanized or zinc plated after fabrication.

(b) Drainage from dissimilar metals—paint dissimilar metals (such as carbon steel, copper, lead, lead-coated copper, red bronze) if used in locations where drainage from them passes over aluminum.

(c) Aluminum to masonry—paint aluminum surfaces in contact with lime mortar, concrete, plaster or other masonry materials with alkaline-resistant coatings, such as heavy-bodied bituminous paint or water-white methacrylate lacquer.

(d) Aluminum to wood—aluminum in contact with wood or other absorptive materials which may become repeatedly wet should be painted with two coats of aluminum metal-and-masonry paint or a coat of heavy-bodied bituminous paint. Alternate: paint the wood or other absorptive material with two coats of aluminum house paint and seal joints with a caulking compound.

(e) Aluminum to treated wood—where aluminum is in contact with treated wood, wood should be treated with pentachlorophenol, 5 per cent minimum concentration, or Wolman salts or creos-

sote or zinc naphthenate (select one). Follow the protective measures outlined in the preceding paragraph.

## Finishes

The variety of finishes provide attractive and colorful surfaces for wall facings. These finishes can blend the metal into decorative schemes as well as impart specific characteristics, such as weather and abrasion resistance. For some applications, the natural surface finishes may be enhanced by chemical or mechanical processes to give a matte, polished or satin appearance. In other instances, economy, size, shape and contour automatically eliminate these finishes and so require the use of a mill finished product.

## Natural or mill finish

For economy, mill finish or as-fabricated finish metal will be used for many curtain walls with subsequent natural weathering tending to uniformly gray the metal without special treatment. A protective oxide coating forms naturally as opposed to ferrous oxide, which is progressive. If the architect desires to use a mechanical or chemical finish, the following information may be used as a guide.

## Pretreatments

Chemical or mechanical pretreatments can be used to change the surface appearance, help obtain uniformity and minimize surface scratches, die lines, etc. Such pretreat operations are normally followed by an anodized treatment, but for some wall facing projects, where economy is a principal factor, the pretreat process may be followed only by a clear methacrylate lacquer coating.

*R1 caustic etch* is the most popular and economical surface treatment for large components, particularly applicable for wall facings. Etching time depends upon individual tastes of fabricator, owner and architect. Longer time minimizes surface imperfections and provides a more matte, uniform appearance. For this reason it is advisable that the architect request samples from a processor for his approval prior to erection of the building.

*C1 satin finish* imparts (by means of belt sanding employing progressive grades of abrasives) a texture consisting of fine parallel scratch lines. Besides being more costly than the caustic etch, this finish is not recommended for large areas due to difficulty in obtaining a uniform appearance.

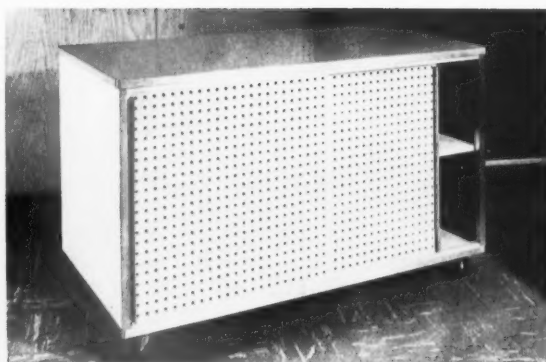
*A1 polish finish* is employed where a high lustrous finish, free from defects, is required. At best a multi-stage operation involving either hand operations or costly mechanical equipment, the number of polishing steps depends upon the condition of the surface. In most cases, this finish is considered unsatisfactory because of cost and non-uniformity.

(Continued on page 36)



# products, equipment, materials

A/E NEWS offers editorial coverage of recent developments by industry. Inquiry cards for further information face pages 8 and 32.



## Classroom cabinets

**MFR'S DESCRIPTION:** Boyd-Britton announces its movable #4000 Series classroom cabinets equipped with either legs or casters in the StoraWall line.

**USES:** classroom storage facilities.

**SPECS/FEATURES:** designed by Robert Picking, Architect-Engineer of Chicago, cabinet is stated to be less costly per unit than the all wood StoraWall #3000 Series movable cabinets and therefore competitive in the classroom cabinet market. Unit illustrated has sliding pegboard doors, structural aluminum frame, and a laminated plastic top with painted  $\frac{3}{4}$ " plywood sides, bottom and back. All edges where damage might occur are protected by metal. The standard finish for the frame is satin-finish aluminum, but anodized colors in aluminum are available. Wood is natural birch but other woods and colors available. Unit shown is part of a varied series.

AIA file no. 17-D

MFG.: BOYD-BRITTON ASSOCIATES  
Circle 20 for further information



## Removable mullion

**MFR'S DESCRIPTION:** a removable aluminum mullion has been introduced by Russwin.

**USES:** designed for installation in pairs of doors to allow single door operation; can be quickly removed to open doors to full width for passage of large objects.

**SPECS/FEATURES:** anodized for lasting finish, mullion has adjustable one-piece strikes and is designed to be quickly dismantled or erected. To install, bottom and top plates of aluminum are anchored to floor and jamb. Mullion fits snugly over bottom plate and is swung into overhead bracket where it is held with two screws. Two stock sizes available with fastenings suitable for mounting in frames of wood or metal and floors of concrete.

AIA file no. 16-C

MFR: RUSSWIN  
Circle 21 for further information



## Automatic dock leveler

**MFR'S DESCRIPTION:** a fully automatic dock leveler, the Mech-O-Dock, Model ML-68, is stated to require no assembly and no expensive installation by its mfr, The Wayne Pump Co.

**USES:** as a solution to the problems of dockside loading and unloading.

**SPECS/FEATURES:** factory assembled and adjusted unit may be installed in front of the dock or in a recessed pit. Unit is completely automatic. As a truck backs in and contacts the bumper actuating mechanism, ramp rises and lowers again to rest on the truck bed. Unit is completely self-contained with no hinges or other loose pieces to assemble. As the truck pulls away, unit automatically levels flush with the dock. Automatic lock support rated at 20,000 lbs of cross or roll over traffic load. Positive locking "safety wedge" action prevents the locks from disengaging under load.

AIA file no. 35-i-141

MFR: THE WAYNE PUMP CO.  
Circle 22 for further information



## Automatic preset system

**MFR'S DESCRIPTION:** Century Lighting, Inc., announces the *Punch* as the most important development in lighting control since it introduced the *C-I Switchboard* about ten years ago.

**USES:** automatic infinite preset system for control of light intensities.

**SPECS/FEATURES:** this control system makes possible an infinite number of presets instead of the ten previously possible. *Punch* feeds correct lighting circuit values for a given cue to a lighting system instantaneously. The *Punch* cards which are used in process are made during rehearsal through a quick automatic process. When the operator has set lighting values for a given cue manually, he presses a button and a cue card is punched within a few seconds. Once set of cue cards for entire show have been made, they are placed in proper sequence in a hopper. The system consists of three elec-

trically operated units: a manual control console, a card punching machine and a card reading machine. Further information available about this unique system.

AIA file no. 31-F-25

MFR: CENTURY LIGHTING, INC.

Circle 23 for further information

## UL rated dumbwaiter door

**MFR'S DESCRIPTION:** The Peelle Co. announces its recently developed UL labeled 1½ hour dumbwaiter door.

**USES:** institutional and commercial structures requiring dumbwaiter installations.

**SPECS/FEATURES:** unit is UL approved and 1¼" thick. Other features: 2½ lb density rock wool heat and sound insulation; safety seal astragal to prevent finger injuries; side latching to permit panels to always latch together on both sides; adjustable guide shoes; vision panel locks on shaft side with a removable ring for easy replacement; positive, fool-proof interlock. Further information including construction details available.

AIA file no. 33-D

MFR: THE PELLE CO.

Circle 24 for further information

## Structural bolt

**MFR'S DESCRIPTION:** a high strength structural bolt combining features of both the *Dardet* and high strength bolt has been introduced by Lamson & Sessions Co.

**USES:** structural connections for steel framing.

**SPECS/FEATURES:** bolts are described as combining tensile strength of hex head bolt with bearing of rivet. Shank is made with specially formed knurls on a spiral which reduce driving load and produce binding fit. Bolts are of high carbon steel, meet ASTM A 325 specifications,

and eliminate necessity of washers. Said to be competitively priced.

AIA file no. 13-C-1

MFR: LAMSON & SESSIONS CO.

Circle 25 for further information

## Aluminum system

**MFR'S DESCRIPTION:** American Art Metals Co. has developed a system of dry-glazed wall construction, *HV Trimline*, stated to give the architect complete freedom for design variations.

**USES:** system of extruded aluminum components for dry-glazed construction.

**SPECS/FEATURES:** system features horizontal and vertical members which permit the architect to place emphasis as he pleases: horizontally, vertically, on the interior or the exterior. Combination color panels and glass, gridwalls and glazed stairwells can be accomplished with components. Aluminum extrusions contain keyed-in vinyl glazing strips. When framework is installed and glazed, vinyl compresses against glass or panel for a positive and permanent resilient seal, inside and out. A perimeter *Weather Bar* provides a method of anchoring and weather-proofing the perimeter of the installation with compression seals. A variety of face members and snap-in-back members gives a wide choice of glass line locations and design variations. There are 12 standard combinations, from which a variety of patterns and effects are possible.

AIA file no. 17-A

MFR: AMERICAN ART METALS CO.

Circle 26 for further information

## Display turntables

**MFR'S DESCRIPTION:** a line of low cost turntables designed for ease of assembly and disassembly on the job is available from Anchor Steel and Conveyor Co.

**USES:** display and industrial transfer applications.

**SPECS/FEATURES:** designed for use in either permanent or temporary installations, units are available in standard sizes up to 16' in diameter, with load-carrying capacities up to three tons. Larger sizes on special order or specification. Made of reinforced standard structural steel members throughout, units contain an assembly of five pieces: (1) two upper circle halves; (2) two lower circle halves; and (3) one sprocket and center bearing assembly. One of the lower circle halves carries turntable drive and idler sprocket assemblies. Twelve bolts are utilized for assembly and disassembly by two-man crew. Diameters range from 4' to 16' in one foot increments. Powered by ½ HP/AC electric motor, table driven by belt drive through gear reducer, then by chain drive to large sprocket on underside of upper circle. Speed range from ½ to 5 rpm is adjustable. Safety of components is provided by gear reducer output shaft which prevents excessive torque build-up or jamming. Input power specified at 110, 220 or 440 v.

AIA file no. 35-H-5

MFR: ANCHOR STEEL AND CONVEYOR CO.

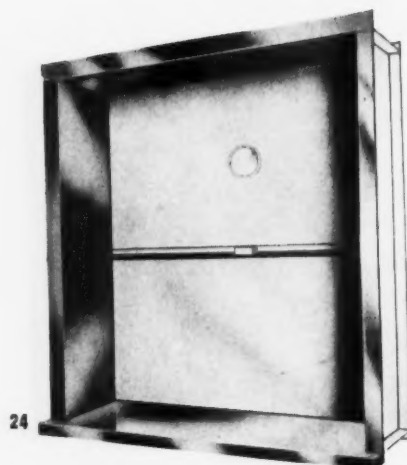
Circle 27 for further information

## Stone cleaner

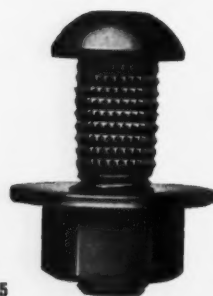
**MFR'S DESCRIPTION:** *Stone Klene*, a product introduced by the Vermarco Supply Co., div. Vermont Marble Co., is described as "the stone cleaner with a brain."

**USES:** on exterior marble, granite, slate and stone.

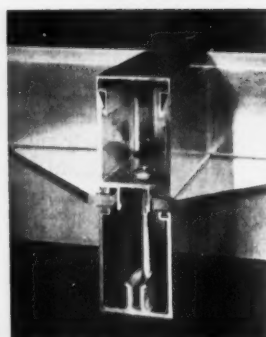
**SPECS/FEATURES:** the "brain" description is applicable, according to mfr, because *Stone Klene* "virtually times itself, signalling when its cleaning action is complete." Shipped dry, product is a gray powder which turns purple when mixed with



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water. Applied to wet stone surface, purple paste turns yellow when chemical cleaning action is finished. Then paste is rinsed off. A result of research conducted by the Vermont Marble Co., product will attack metallic stains and reduce them to colorless metallic salts without attacking metal window frames, etc. themselves. *Stone Klene* is mixed with cold water to varying degrees of thickness: thin for flat surfaces and thick paste for vertical surfaces. A thixotropic agent is included in its formula to keep product on vertical surfaces. Although product kills grass and is not for polished interior marble, it can be applied to all types of exterior stone with a minimum of preparation and protection to apparel of applicator.

AIA file no. 8-H

MFR: VERMARCO SUPPLY CO.,  
DIV. VERMONT MARBLE CO.

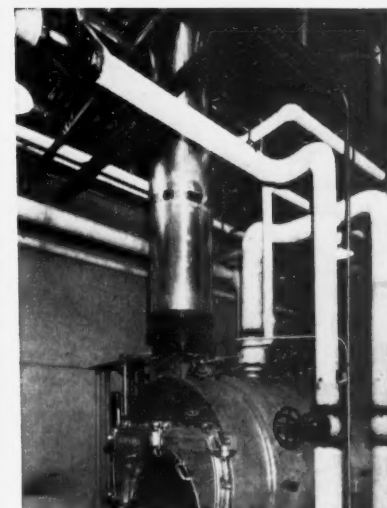
Circle 28 for further information

### Glass heat shield

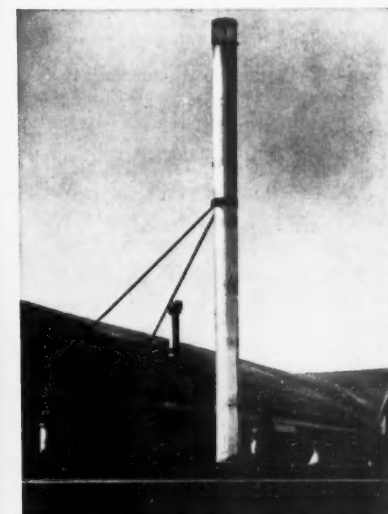
**MFR'S DESCRIPTION:** a *Pyrex* brand plate glass heat shield which reflects 65 percent of long wave infra-red has been developed by the Corning Glass Works.

**USES:** in commercial and industrial operations for protection and comfort of personnel working in areas of intense heat.

**SPECS/FEATURES:** window of tempered *Pyrex* glass is covered with a thin, transparent metallic film. Heat literally bounces off coating which is permanently bonded to glass. Glass itself does not become hot. According to mfr, glass shield can be used to advantage in television and motion picture studios, research laboratories and other building types. It may protect delicate instruments and offer an effective means of reducing air conditioning loads. Available in three standard sizes: 24" x 24", 24" x 36" and 24" x 48". Special sizes for cus-



Van-Packer Stack can be superimposed on boiler or floor supported on Tee Section.



With Hi-Temp Sections, stack handles incinerator flue temperatures to 2000°F.

## Van-Packer's refractory construction means longer stack life at much less cost

Low original cost (about the same as a comparable steel stack) plus substantially longer life makes the Van-Packer Stack by far the most economical for industrial boilers and incinerators.

The stack is prefabricated of a special refractory material cast in 3-foot sections, and is available in eight diameters from 10-inch ID to 36-inch ID. Sections are simply cemented one atop another with special high temperature acidproof cement.

Boilers and furnaces take a Van-Packer with Stand-

ard Sections; Hi-Temp Sections are used for incinerators. Because it is non-corrosive, inside and out, a Van-Packer will outlast a steel stack by three times on the average, yet costs no more than a comparable steel stack. Corrosion-resistant metal jacket needs no painting or maintenance.

Van-Packer Stacks are available through local Van-Packer Jobbers and Special Representatives. See "Smoke Stacks" or "Chimneys — Prefabricated" in yellow pages of your classified directory.

Write for Bulletin 15-32-63

# VAN-PACKER

Division of FLINTKOTE America's Broadest Line of Building Products  
Van-Packer Co. 1232 McKinley Ave., Chicago Heights, Ill. • Skyline 4-4772



Circle 8 for further information



# products, equipment, materials

tom specification. Thermal shock resistance, high mechanical strength, chemical and abrasion resistance are other properties cited.

AIA file no. 26-A-9

MFR: CORNING GLASS WORKS  
Circle 29 for further information

## Fast setting material

**MFR'S DESCRIPTION:** superior resistance to chemical attack and mechanical abuse are claimed for *Emeri-Epoxy*, a fast setting flooring material recently introduced by the Walter Maguire Co., Inc.

**USES:** topping or resurfacing concrete, wood, tile, stone, brick and metal flooring.

**SPECS/FEATURES:** product combines a graded emery aggregate developed by mfr for heavy duty industrial concrete, and an epoxy resin and a solid chemical binder which provides a liquid catalyst. Product stated to be extremely resistant to abrasion and mechanical shock, and resistant to water, steam, oil, grease, caustics, sugars and syrups and practically every kind of acid. Application is made in thicknesses from 1/16" to 1/4" and feathering possible to a membrane-thin edge. Non-freezing, flexibility and non-shrinking properties also stressed.

AIA file no. 23-G

MFR: WALTER MAGUIRE CO., INC.  
Circle 30 for further information

## Precast roof slabs

**MFR'S DESCRIPTION:** Federal Cement Tile Co. announces that its *Insul-coustic* lightweight aggregate precast concrete roof-deck slabs combine low cost and exceptionally high insulating and acoustical values in one structural roof-deck material. Economy is stated to result from automated production.

**USES:** roof-decks.

**SPECS/FEATURES:** with a noise reduction coefficient (NRC) of .60, no additional sound quieting treatment is required according to mfr. Manufactured in 2", 2 1/2", 3", 3 1/2" or 4" thicknesses, slabs have an insulation "U" factor ranging from .25 down to .145 depending on thickness. Slab weights from 6 lbs to 12 lbs/sf. Lighter weight requires less structural steel support, yet *Insul-coustic* slab for roof-deck stated to offer minimum design load factor of 65 lbs/sf, with a safety factor of 4, giving an ultimate safe load bearing capacity of 260 lbs/sf. Slab units installed with bulb tees, when joist spacing is greater than 36" oc, or without bulb tees on bar joist, concrete joists or other structural members when joist spacing is no more than 36" oc. If installed without bulb tees, slabs may be clipped to purlins with galvanized clips. Grouting with asphaltic cement or cement grout possible on four sides due to beveled edge detail. End grouting effects positive lock at bulb tee. Other features stressed are appearance, finish, fire-safety and weather resistance.

AIA file no. 4-E-6

MFR: FEDERAL CEMENT TILE CO.  
Circle 31 for further information

## Wallcovering

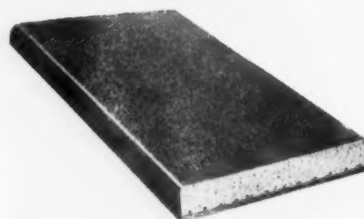
**MFR'S DESCRIPTION:** *Lanai* is added to *Vicrtex VEF*, vinyl wallcovering fabric line of L. E. Carpenter & Co., Inc.

**USES:** residential and institutional installations such as hotels, apartments, restaurants, lounges and shops.

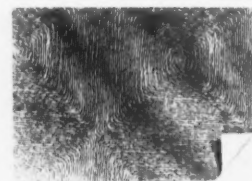
**SPECS/FEATURES:** *Lanai*, simulating Hawaiian decor, is said to be a durable and permanent wall covering. Mfr stresses durability, fadeproof, frayproof, acid and stain resistant qualities, and ability to clean with only damp cloth. Prices and swatches available on this item and 40 other styles in line.



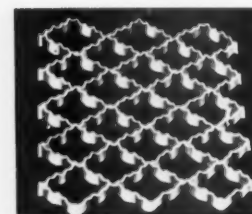
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AIA file no. 28-C

MFR: L. E. CARPENTER & CO., INC.  
Circle 32 for further information

## Non-skid unit

**MFR'S DESCRIPTION:** Bustin Steel Products has introduced an all directional non-skid flooring material, *Protecto*.

**USES:** safety grille for stair treads, platforms, etc.

**SPECS/FEATURES:** economy, safety, lightweight and sturdy properties stressed. Available in 9' lengths and a wide selection of widths. Mfr states that his tests have demonstrated that "it is practically impossible to slip on *Protecto* even when heavily coated with grease and set on an angle."

AIA file no. 17-A

MFR: BUSTIN STEEL PRODUCTS, INC.  
Circle 33 for further information

## INSULATION

### Industrial insulation

**MFR'S DESCRIPTION:** an industrial insulation of the rigid board type, known as *K-Board*, has been introduced by Keasbey and Mattison Co.

**USES:** considered suitable for ceilings, walls and floors in building and housing equipment generating high temperatures, such as hot tanks and other heat producing apparatus.

**SPECS/FEATURES:** has low thermal conductivity (k-factor) and low density. Furnished in sheets 42" x 48" with thickness of 1/8", 1/4", 3/8" and 1/2". Asbestos fibers are combined with incombustible and chemically inert ingredients and pressure-formed into a sheet. *K-Board* stated to retain dimensional stability where humidity and steam are a factor, and not to deteriorate in areas where condensation is likely to occur. Testing shows a soaking heat of 1,200°F maxi-

num. Can be worked with ordinary carpenters' tools.

AIA file no. 37-B-1

MFR: KEASBEY AND MATTISON CO.

Circle 34 for further information

### Panel application

**MFR'S DESCRIPTION:** nineteen thicknesses of *Foamglas* insulation are now available for factory-laminated architectural panels according to the Pittsburgh Corning Corp.

**USES:** panel structures.

**SPECS/FEATURES:** the availability of this wide range of sizes stated to give architects new freedom in the design of panel structures. Thicknesses range from 1" to 2 1/8" in increments of 1/16". Thicker material over 2 1/8" is also available. The cellular glass insulation is composed of millions of sealed glass cells which are impervious to moisture and vapor penetration. Rigidity, high compressive strength and non-moisture absorbency are physical properties which contribute to dimensional stability and the strength of the panel.

AIA file no. 37

MFR: PITTSBURGH CORNING CORP.

Circle 35 for further information

### Pre-formed type

**MFR'S DESCRIPTION:** *Presst-O-Cel*, a pre-formed, closed cell-type insulation for architectural specifications in areas requiring refrigeration service, has been developed by the Presstite Div., American-Marietta Co.

**USES:** covering for tubes and pipes subjected to temperature or humidity conditions.

**SPECS/FEATURES:** tubular insulation consists of millions of tiny closed cells that exclude water, moisture and air. K-factor is extremely low: 0.30 at 120°F. Other mechanical and physical properties stressed are: (1) flexibility; (2) oil, acid, alkali resistance; (3) rat, vermin and fungi resistance; (4) high insulation value; (5) long life—product inert to ozone; and (6) self extinguishing: will not

support combustion. Packaged in 6' lengths and available in 1/2" wall thickness for all standard pipe sizes from 3/8" to 2 1/2".

AIA file no. 37-E

MFR: PRESSTITE DIV., AMERICAN-MARIETTA CO.

Circle 36 for further information

## PLASTICS

### PV film

**MFR'S DESCRIPTION:** limited production of *Type R* polyvinyl fluoride film, stated to have outstanding weathering characteristics coupled with excellent chemical resistance and mechanical resistance and mechanical strength, has begun by E. I. Du Pont de Nemours & Co.

**USES:** surfacing film as a finish for prefabricated industrial and commercial metal buildings and other building materials.

**SPECS/FEATURES:** available in either satin or glossy finish at about \$5.00 per lb, and in widths from 42" to 50" in thicknesses of 1 to 4 mils. Area factor is 140 sf lb per mil.

AIA file no. 25-B-17

MFR: E. I. DU PONT DE NEMOURS & CO.

Circle 37 for further information

### Plastic veneer

**MFR'S DESCRIPTION:** The Reynolds Metals Co. has developed a matte-finish, polyvinyl alcohol film, introduced in use as a veneer on steel cabinet doors of Youngstown Kitchens.

**USES:** matte-plastic veneer for furniture, cabinet work, table tops and paneling.

**SPECS/FEATURES:** made by Sedlow Plastics, *Kevinite* has "hand-rubbed" wood design printed on paper coated on both sides with a polyester resin. Material is flexible which permits it to be shipped, stored and marketed in roll form. Tests conducted by Reynolds for typical household conditions demonstrated durability and resistance.

AIA file no. 35-C-12

MFR: REYNOLDS METALS CO.

Circle 38 for further information

## MISCELLANY

### Roofing nails

**MFR'S DESCRIPTION:** Owens-Corning Fiberglas Corp. announces 1 3/16" diameter *Flex-head* nail with movable head.

**USES:** roof insulation fasteners for wood and/or steel decks.

**SPECS/FEATURES:** movable head, designed specifically for *Fiberglas* insulation by E. S. Products Co., rides up and down as pressure is released or exerted, thereby providing flexibility in installation methods of roof insulation. *Flex-head* permits direct fastening of insulation to wood deck without roofing paper or bitumen. For steel decks, nail has tapered shank and machined cutting edges for secure attachment.

AIA file no. 27-A

MFR: OWENS-CORNING FIBERGLAS CORP.

Circle 39 for further information

### Fireplace log igniter

**MFR'S DESCRIPTION:** the *Blue Flame Log Lighter*, designed to quickly ignite fireplace logs, is announced by Canterbury Enterprises as filling a need for an efficient, permanent, inexpensive device to attach to the gas line stub in the fireplace.

**USES:** replace manual kindling of residential fireplaces.

**SPECS/FEATURES:** mfr states device fills product void by making possible a means to start a fire without kindling, and permitting homeowner to enjoy fireplace without being a slave to it. Unit, measuring 20 1/2" including air-gas mixing chamber and steel pipe with 15 jet burner holes, retails for less than \$5.00.

AIA file no. 14-E

MFR: CANTERBURY ENTERPRISES

Circle 40 for further information

### Explosion-proof tap

**MFR'S DESCRIPTION:** an explosion-proof current tap designed to eliminate "plugging-in" dangers is announced by Appleton Electric Co.

**USES:** designed primarily for



**HOME INSURANCE...**

Save paint, wood, metal with MIDGET LOUVERS

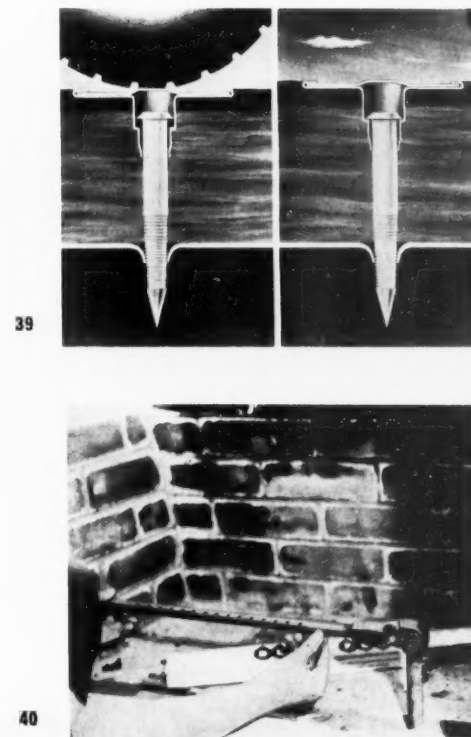
Controls moisture vapor, eliminates rot, corrosion, excessive heat . . . just drill hole, press into place, no nails, screws, special tools. Available in aluminum, anodized aluminum, chrome, copper . . . all screened. Regular (rain shielded) and L.D. types, sizes 1" thru 6". Install in wood, metal, concrete.

Write for home preservation information—

**MIDGET LOUVER COMPANY**

6 WALL STREET NORWALK, CONN.

Circle 9 for further information



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## products, equipment, materials

use in hospital operating rooms but has many other hazardous area applications.

**SPECS/FEATURES:** current tap has three branch receptacles, each employing dead-end principle to isolate exposed contacts from live inner contacts for positive explosion-proof protection. Three-pole receptacles in current tap will take standard Appleton type "CPP Form I" plugs as used in its "CPS" wall receptacle series. Housing and covers are made of non-sparking materials. Internal wiring completed at factory.

AIA file no. 31-C-7

MFR: APPLETON ELECTRIC CO.  
Circle 41 for further information

### FIRE-RATED MATERIALS

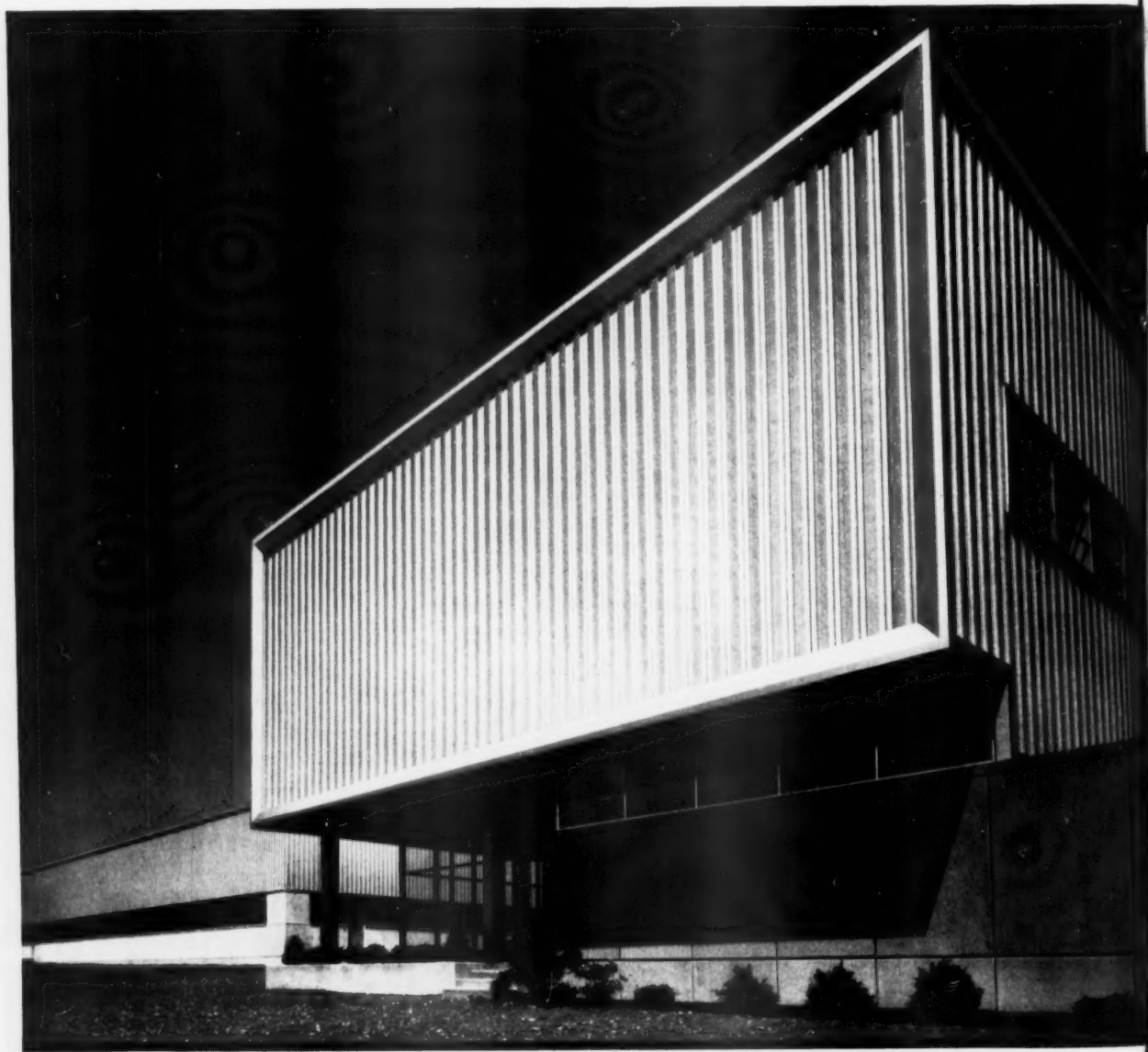
#### Four-hour fire rating

**MFR'S DESCRIPTION:** Permalite Acoustical Fire-Gard is first direct-to-steel plaster application to qualify for four-hour U.L. rating, when electrical outlets are incorporated in the floor system. Product is special formulation of expanded perlite, offered as a means of construction costs savings when machine-applied directly to the underside of cellular steel floors.

**USES:** recommended in warehouses and similar industrial and commercial structures.

**SPECS/FEATURES:** the fireproofing material is lightweight and is designed to eliminate the need for a suspended ceiling below electrified cellular steel flooring, previously required by national fire codes. Material may be applied in a uniform thickness following the corrugations or cellular contours of steel decking and need not be brought to level surface unless architecturally desirable. Acoustical control claimed: material rated at .60 noise reduction coefficient. Final

# Mahon METAL CURTAIN WALLS



Bright New Plant and Office Building for Pittsburgh Screw and Bolt Corporation, Mt. Pleasant, Pa. Mahon Aluminum Curtain Walls were employed throughout. The Mahon Company also furnished Five Rolling Steel Doors for this Modern Industrial Plant. Engineers and Builders: The Austin Company, Cleveland, Ohio.

Serving the Construction Industry Through Fabrication of Structural Steel, Steel Plate Components, and Building Products

Circle 10 for further information

Architectural & Engineering News

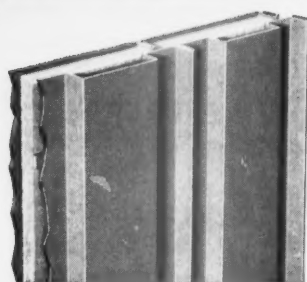


# Sin Bright Metal or Color Offer Designers Greater Latitude in Exterior Treatment!

**Mahon Walls can be Erected up to 60 Ft. in Height without a**

**Horizontal Joint . . . Vertical Joints are Invisible**

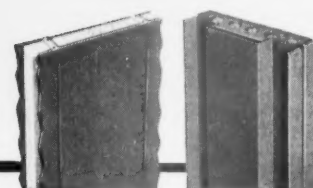
**ALUMINUM or STAINLESS  
GALVANIZED or PAINTED STEEL**



**MAHON FLUTED WALL**  
FIELD CONSTRUCTED



**MAHON RIBBED WALL**  
FIELD CONSTRUCTED



**FLUSH FLUTED**  
**MAHON PREFAB WALL PANELS**

## ☆ OTHER MAHON BUILDING PRODUCTS and SERVICES:

- Underwriters' Rated Metalclad Fire Walls
- Rolling Steel Doors (Standard or Underwriters' Labeled)
- M-Floors (Electrified Cellular Steel Sub-Floors)
- Long Span M-Decks (Cellular or Open Beam)
- Steel Roof Deck
- Permanent Concrete Floor Forms
- Acoustical and Troffer Forms
- Acoustical Metal Walls and Partitions
- Acoustical Metal Ceilings
- Structural Steel—Fabrication and Erection
- Steel Plate Components—Riveted or Welded

☆ For INFORMATION See SWEET'S FILES  
or Write for Catalogues

**THE R. C. MAHON COMPANY • Detroit 34, Michigan**  
Sales-Engineering Offices in Detroit, New York and Chicago  
Representatives in all Principal Cities

# MAHON

**products,  
equipment,  
materials**

coat may be colored by inclusion of lime-proof plaster colors. When suspended ceiling is desired, use of product on bottom of steel floors permits flexibility in number of openings in suspended ceiling for light fixtures, AC grilles or interior partitions. Fire test was sponsored jointly with Granco Steel Products Co., mfr of the steel flooring.

AIA file no. 21-C-1

MFR: MINING & MINERAL PRODUCTS DIV., GREAT LAKES CARBON CORP.

Circle 42 for further information

### 2-hr acoustic tile

MFR'S DESCRIPTION: an acoustical product development, called Armstrong *Acoustical Fire-Guard*, is said to add significant properties of fire-protection to public buildings, according to the Armstrong Cork Co.

USES: fire-rated acoustical tile ceiling systems.

SPECS/FEATURES: mfr states that product is first acoustical tile ceiling to gain a two-hour fire retardant time design rating in official tests conducted by UL. It is designed to provide effective fire protection for structural steel members and the floor or roof assembly under which it is installed. System not only provides a simplified procedure for protecting structural steel members and floor assemblies against fire damage, but saves construction time as well. Testing also demonstrated that product offers sufficient protection for structural steel joists to enable them to carry their prescribed loads for over six hours in a fire. Heart of system is a densely packed mineral fiber tile with a special tongue, groove and kerfed edge detail that permits an interlocking of the tiles. Each tile rests on a clip spline, 3½" in length, which has been snapped onto a steel main runner. Runners are installed on 12"

Structure  
Product Steel and Aluminum

# products, equipment, materials

centers and are attached to the bar joists or carrying channels with galvanized clips placed at nominal 4' intervals. Border tiles are supported by concealed annular nails inserted in border splines and fastened into nailing channels. NRC rating of .75. Initial production will provide full random perforated design only. More designs to follow. Mfr supports claims with fully documented testing by UL.

AIA file no. 39-B

MFR: ARMSTRONG CORK CO.  
Circle 43 for further information

## HVAC

### Combination AC/heater

MFR'S DESCRIPTION: a packaged, air-cooled air conditioner and gas-fired heater combination, designed for roof-mounting, has been introduced by Typhoon Air Conditioning Co., div. Hupp Corp.

USES: stated to be particularly suitable for heating and cooling shopping center stores, super markets and similar one-story structures that require a simple, economically installed heating and cooling system.

SPECS/FEATURES: available in two sizes with nominal air conditioning capacities of 5 and 8 tons. Roof-mounted and air-cooled which permits freeing of valuable floor space for selling and other operations and stated to eliminate all maintenance encountered with the water towers, pumps and piping of water-cooled systems. Gas-fired heating system is completely self-contained unit capable of 160,000 BTU/hr output. Total unit consists of cooling system, gas-fired heating unit, air filters, blowers and controls. All internal piping and wiring is factory pre-set, leaving fuel and electrical connections for field. An air distribution plenum and diffuser is also supplied. Compactness of unit a feature: 55" x 92" and 74"

high. The 5 ton unit weighs 2,000 lbs and the 8 ton unit, 2,200 lbs. Further technical information available.

AIA file no. 30-F-2

MFR: TYPHOON AIR CONDITIONING CO., DIV. HUPP CORP.  
Circle 44 for further information

### Belt drive duct fans

MFR'S DESCRIPTION: variable pitch drives, designed to permit quick and easy adjustment of fan speed, are standard equipment on the redesigned line of belt-drive duct fans now being manufactured by the Hartzell Propeller Fan Co.

USES: air delivery in duct system.

SPECS/FEATURES: simple adjustment on driver sheave of fans will slow fan down to reduce air deliveries by up to 1/3 where maximum catalog performance is not required. Another feature is complete standardization of components within each fan size. This means that a change of motors to meet changing air delivery needs requires no modification of the fan and can be made while the fan is still in place in the duct work. Bearings and shaft on all fans, and furnished for maximum load any model in that size would produce. Thus a fan which is no longer needed for its original application can be economically converted to handle another job.

AIA file no. 30-D-1

MFR: HARTZELL PROPELLER FAN CO.  
Circle 45 for further information

### Industrial dehumidifier

MFR'S DESCRIPTION: to meet requirements for continuous low-volume drying of air, gas or liquids, Universal Dynamics Corp. recently introduced a small, commercial-industrial dehumidifier, the Model A12.

USES: laboratories, manufacturing plants and storage rooms

or accelerated drying of temperature sensitive products.

SPECS/FEATURES: described as a compact dual tower absorption dehumidifier capable of handling up to 70 cu. ft. of air per min. Dual tower feature makes possible continuous drying. The unit may be installed either inside or outside of space to be controlled. Humidistat controls for use in a room are available for close tolerances (plus or minus 0.5 per cent relative humidity).

AIA file no. 30-D-5

MFR: UNIVERSAL DYNAMICS CORP.  
Circle 46 for further information

### Velocity attenuators

MFR'S DESCRIPTION: Connor Engineering Corp's *Removable Under-Window* high velocity valve attenuators are stated to permit their removal through a top discharge grille.

USES: to satisfy engineering demands for balanced air-delivery, zone controlled air diffusion and space conservation.

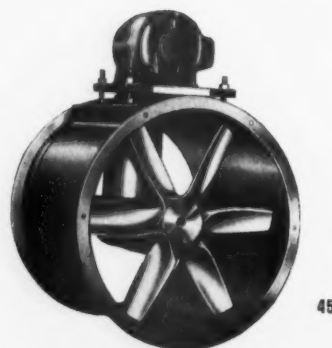
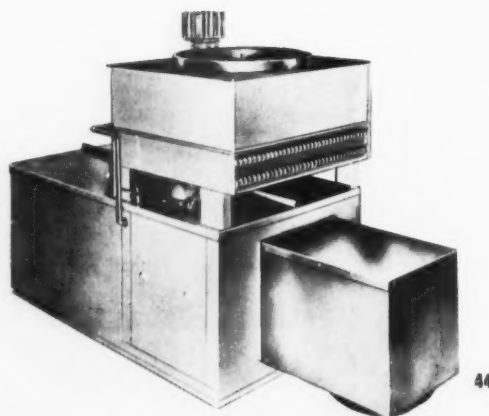
SPECS/FEATURES: units removed with ease and reinstalled to eliminate necessity of breaking through walls and window ledges to provide the service required by any moving mechanism. This design feature alone enables the architect to specify special attractive, interior materials. Mfr states the units are ideal for northern climates because of operating characteristics of the *Under-Window* units.

AIA file no. 30-J

MFR: CONNOR ENGINEERING CORP.  
Circle 47 for further information

### WOOD FLOORING Hardwood mosaic

MFR'S DESCRIPTION: *Microsaic*, solid hardwood mosaics, a recently developed type of floor-



ing originating in Europe, is now being manufactured in the United States exclusively by Miller Bros. Co., Inc.

USES: decorative wood flooring.

SPECS/FEATURES: process assembles mosaics into 18" x 18" sheets with paper on face to facilitate installation directly on concrete slab or plywood sub-floor. After flooring is laid in an especially formulated mastic, paper topping is removed; then sanded and finished. Installation and finish prices vary and range according to pattern and wood species. Some types stated to be competitive with less expensive resilient tiles and others are competitive with vinyl and rubber tiling.

Micro-saic flooring is stated to achieve unique stability because of alternating grain of woods, and because individual pieces are not laminated but adhered independently to sub-floor. Italian Micro-saic consists of 400 individual 9/10" square pieces of 5/16" thick hardwood in each 18" sheet. Available in random pattern of six hardwood species or entirely of oak. Standard product consists of 4 1/2" staves, 5/16" thick, arranged into 16 squares on each 18" sheet. Manufactured entirely of oak, maple, walnut and cherry. Special and custom design inserts possible.

AIA file no. 19-E-9

MFR: MILLER BROS. CO., INC.  
Circle 48 for further information

### Wood tiles

MFR'S DESCRIPTION: maple and oak, two hardwoods, are now being used as raw materials for the manufacture of Par-Tile, natural wood block flooring, according to mfr, Pacqua, Inc. Par-Tile previously had been made only of Douglas fir.

USES: finished wood flooring.

SPECS/FEATURES: wide range of natural tone selection: from light textured character of oak to medium-toned Douglas fir and darker warm colors of maple. Mixed patterns also available. Density of product is 55 lbs/ci which is 20 times harder than hardwood. All three species have

this density.

AIA file no. 19-E-9

MFR: PACQUA, INC.  
Circle 49 for further information

### Grain direction change

MFR'S DESCRIPTION: Harris Mfg. Co. announces that change of direction every 4 3/4" in the manufacture of its Bondwood flooring gives longer life to floors.

USES: various types of buildings including gymnasium floors.

SPECS/FEATURES: units are 5/16" x 19" x 19", composed of sixteen 4 3/4" x 4 3/4" squares, with grain direction changing every 4 3/4". Produced from vertical grain hardwoods, therefore provides equal resistance to wear in any direction. Further information available.

AIA file no. 19-E-9

MFR: HARRIS MFG. CO.  
Circle 50 for further information

### METAL PRODUCTS

#### Anodized tubing

MFR'S DESCRIPTION: Anodized aluminum (brass tinted) tubing and accessories are announced by Stanley-Judd.

USES: drapery rods and brackets suitable for residences and structures near water or salt air. SPECS/FEATURES: designed with corrosion resistant finish, to be light in weight and tarnish proof. Tubing available in 1" and 3/4" diameters, in 12' lengths. Finial ends are styrene plastic, vacuum plated with brass, and stated to be dent proof and resistant to scratching.

AIA file no. 27-C

MFR: STANLEY-JUDD, DIV.,  
THE STANLEY WORKS  
Circle 51 for further information

#### Mobile storage

MFR'S DESCRIPTION: a storage system designed to be mobile and save space is offered by Dolin Metal Products, Inc.

USES: office and factory buildings.

SPECS/FEATURES: mfr states that in commonly-used fixed row

type storage systems (shelving, files, cabinets, etc.), one aisle is required for every two rows of storage equipment. With the "Dolin" system, only one aisle is required for six, seven, eight or more rows of storage equipment. This reclaimed aisle space can be used for a maximum additional storage space of 80 per cent. This is accomplished by combining rows of rolling storage equipment on 1/2" high tracks with rows of fixed equipment with only 3"

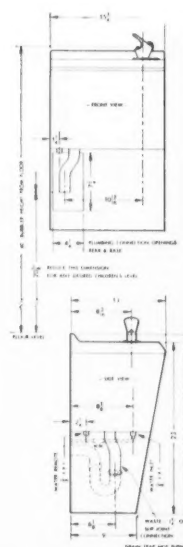
clearance between rows. Each mobile row contains one or two storage units less than the fixed row, permitting each mobile unit to roll along the tracks providing immediate access to any rear unit.

AIA file no. 35-H-42

MFR: DOLIN METAL PRODUCTS, INC.  
Circle 52 for further information

### Steel service counters

MFR'S DESCRIPTION: Penco

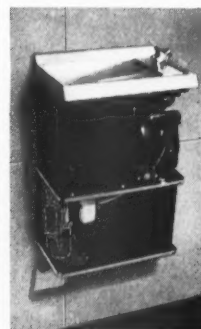


Haws Model HWT-13



**CLEAN**

*from every angle...*



HAWS brilliant new wall mounted electric water coolers are a *clean break* with tradition! Compact design hugs the wall — leaving floor area clear! Crisp, clean styling is crowned by gleaming stainless steel — with plumbing and electrical unit completely enclosed. HAWS "cleans the deck" for uncluttered maintenance ease and shining clean floors. This innovation in water cooler concept and design scores a *clean sweep* for HAWS — leader in the field since 1909! Find out about HAWS' complete line of drinking facilities. See HAWS Catalog in Sweet's Architectural File or write for your copy today.



**HAWS DRINKING FAUCET CO.**  
1441 Fourth Street  
Berkeley 10, California

WRITE FOR DATA ON HAWS CAFETERIA AND RESTAURANT WATER COOLERS

Circle 11 for further information



# products, equipment, materials

Metal Products Div. announces a line of heavy duty steel counters constructed of standard Penco components.

USES: commercial, industrial institutional.

**SPECS/FEATURES:** wide range of sizes offered, with standard height of 39". Assembly of two sections, each 36" wide, 24" deep and 39" high. Linoleum tops available. Green and gray are standard colors. Shipped knocked-down or factory assembled. Assembly with screw-driver and wrench.

AIA file no. 35-C-12

MFR: PENCO METAL PRODUCTS DIV., ALAN WOOD STEEL CO.  
Circle 53 for further information

## Modular storage system

**MFR'S DESCRIPTION:** Vidmar, Inc. offers improved industrial storage systems based on modular concept to provide 50% efficiency over present plant storage arrangements.

USES: provide complete visual inventory control of all stored items.

**SPECS/FEATURES:** simple, locking device permits all drawers in bank of cabinets to be locked with turn of handle. Interchangeability of component units and wide variety of interior arrangements. 400 lb carrying capacity per drawer, saving floor space. Made in number of housing heights from bench level to 10' and engineered so fully-loaded drawer will not spill or sag. In 25 sf of floor space, it is possible to store 24,000 lbs of materials.

AIA file no. 35-i-15

MFR: VIDMAR, INC.  
Circle 54 for further information

## FENESTRATION

### Aluminum windows

**MFR'S DESCRIPTION:** The Sealair line of commercial aluminum windows including projected, casement, classroom, top

hinged and pivoted windows, has been revised by Kawneer Co.

USES: commercial applications with curtain wall systems and conventional masonry openings.

**SPECS/FEATURES:** windows have flush interior and exterior surfaces and are available in either solid or tubular sections. Vents have double weatherseals and can be wet or dry glazed with vinyl from inside or outside. Hardware is solid white bronze or stainless steel with no exposed fasteners. No screws or fastenings are visible. Standard finish is etch and lacquer; Kawneer Alumilite and lacquer finish is available at additional cost.

AIA file no. 16

MFR: KAWNEER CO.  
Circle 55 for further information

### Horizontal sliding unit

**MFR'S DESCRIPTION:** a recently developed line of horizontal aluminum sliding windows is now in volume production according to Material Industries, Inc.

USES: quality residential work, better motels, clinics, dormitories and other institutional construction.

**SPECS/FEATURES:** mfr emphasizes window unit designed for "quality" market exclusively and stresses various features of unit's assembly: (1) two panes of glass permanently sealed at edges to provide an area of insulating air. Stated to eliminate need for washing interior surfaces which are preserved spotless and free from condensate; (2) automatic bolt lock; (3) wedging interlocks, perimeter seal; (4) ball-bearing rollers; (5) 12½° drain-off slope; (6) heavy-duty sections. Sizes range from 2' x 2' to 12' wide x 6' high. Special sizes and types available. Mfr claims units, although designed for "quality" market, are

priced competitively with most similar windows.

AIA file no. 16-E

MFR: MATERIAL INDUSTRIES, INC.  
Circle 56 for further information

## GUTTERS

### Wiring gutters

**MFR'S DESCRIPTION:** enclosed rain-tight gutters designed to provide all-weather protection for wiring are now being produced by Keystone Mfg. Co.

USES: designed for outdoor installations where wiring must be protected against damage from the elements.

**SPECS/FEATURES:** feature welded-on tops with overhanging flanges. A sealing device furnished as standard equipment helps prevent tampering, and the slip-on removable front covers require fewer screws thereby facilitating installation and maintenance. Available in standard 4" x 4" and 6" x 6" sizes in 1' through 6' lengths. Formed of code gauge galvanized sheet steel, all units supplied with combination knockouts on the bottoms, and all feature spot welded construction to provide a tight, protective enclosure. Standard finish is a corrosion-resistant gray baked enamel on a galvanized surface.

AIA file no. 12-P

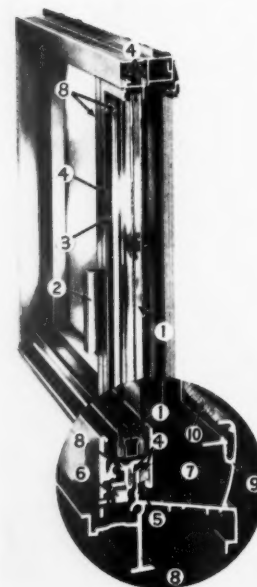
MFR: KEYSTONE MFG. CO.  
Circle 57 for further information

### Aluminum gutters

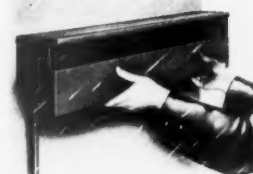
**MFR'S DESCRIPTION:** a 4" box gutter and downspout system is now available from the Aluminum Company of America.

USES: rain-carrying equipment.

**SPECS/FEATURES:** product is addition to Alcoa's line of 5" gutters. Both sizes are available in two finishes, stucco embossed and standard mill finish. Units, adaptable for both original or



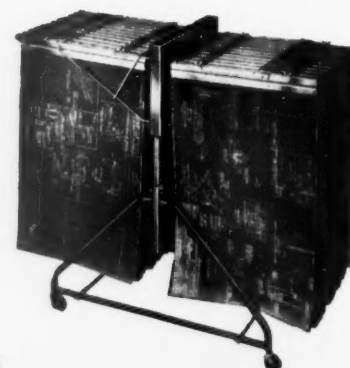
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59



60

replacement installations, are formed of heavy gauge Alclad sheet—a high strength alloy. Features stressed are strength, rigidity, maintenance freedom, simplicity of detail and installation. According to Alcoa, unsightly straps, slip joint connectors and inflexible prefabricated miter joints have been eliminated.

AIA file no. 17-A

MFR: ALUMINUM COMPANY OF AMERICA

Circle 58 for further information

## OFFICE EQUIPMENT

### Electric erasing unit

MFR'S DESCRIPTION: Charles Bruning Co. announces the introduction of a hollow shaft electric erasing machine.

USES: drafting room.

SPECS/FEATURES: housed in lightweight die-cast aluminum with baked enamel finish, machine has symmetrical contours and no sharp edges. Has non-slip gripping surface for ease of hold and tapered shank permits ease of manipulation for close work. Operation is by index-finger pressure on a sensitive switch which sets the eraser in operation at 3,100 rpm. Safety feature is lock-chuck to prevent eraser wobble or "flyout." Seven in. eraser insert is used.

AIA file no. 35-H-3

MFR: CHARLES BRUNING CO., INC.

Circle 59 for further information

### Mobile vertical file

MFR'S DESCRIPTION: a major improvement in its "Rolling Stand" vertical plan file is announced by the Plan Hold Corp. The unit is stated to be redesigned so that the height can be adjusted for filing sheets of any length up to 66".

USES: drafting room.

SPECS/FEATURES: unit is mobile, gliding on ball bearing casters and designed to be readily moved to any desired location. Units used in batteries or back-to-back in the center of the room. Up to 1,200 large sheets can be used when unit is equipped with "Plan Hold

Brackets and Binders." Width is 24"; made of 14 ga. tubular steel with gray baked enamel finish. For greater capacity, the "Double Rolling Stand" is introduced to provide vertical filing for up to 2,400 sheets with a maximum length of 36". Prices: adjustable "Rolling Stand" is \$34.95 and "Double Rolling Stand" is \$24.95.

AIA file no. 35-H-32

MFR: PLAN HOLD CORP.

Circle 60 for further information

## PIPING/COILS

### Asbestos-cement pipe

MFR'S DESCRIPTION: asbestos-cement pipe, in 14" and 16" diameters, is available from Keasbey & Mattison Co.

USES: in pressure installations, gravity sewer lines and irrigation systems.

SPECS/FEATURES: pipe is manufactured in classes 100, 150 and 200 to conform to AWWA, ASTM and Federal specifications, according to mfr. Said to be available in five crushing strengths intended to meet a variety of field conditions. Will be furnished in standard 12' lengths and special short lengths: 6'-6" and 3'-3". Pipe in larger diameters will be available in 150' hd., 225' hd., 325' hd. and 450' hd.

AIA file no. 29-B-6

MFR: KEASBEY & MATTISON CO.

Circle 61 for further information

### Swimming pool coils

MFR'S DESCRIPTION: self-contained swimming pool heating coils are now available as optional equipment on the complete line of Edwards residential hot-water boilers, according to the Edwards Engineering Corp.

USES: heating residential swimming pools.

SPECS/FEATURES: for nominal costs, self-contained water heater coil plate may be obtained with an additional heating coil to supply a separate circuit. Additional circuit may be connected with its own circulator or booster. Mfr emphasizes that such an arrangement in no way contacts or mixes with the boiler

## Specify

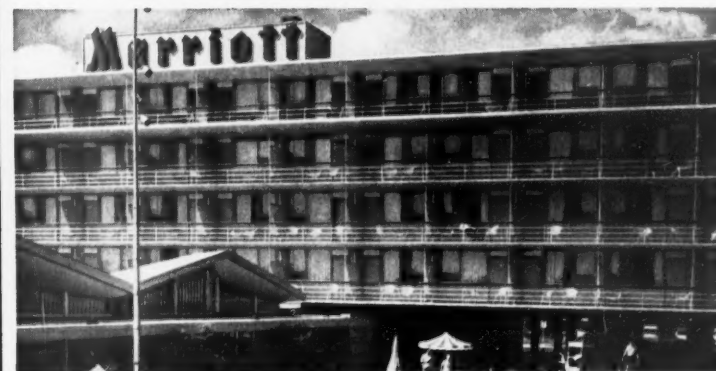
# PLASTER-WELD

permanently bonds new plaster to concrete... for as little as 2¢ per square foot



DUPONT PLAZA CENTER, MIAMI, FLORIDA

Plaster-Weld is the amazingly versatile, patented liquid bonding agent today specified on hundreds of remodeling and new construction projects by leading architects the country over. In the case of the Dupont Plaza Center, shown at left, Plaster-Weld was used to permanently bond finish plaster to interior concrete surfaces and stucco to exterior concrete surfaces. Archt.: Frank H. Shullin & Associates, Miami; Genl. Contr.: Arkin Construction Company, Miami Beach; Plstg. Contr.: E. L. Thompson Co., Atlanta, Ga.



MARRIOTT MOTOR HOTEL, WASHINGTON, D. C.

With Plaster-Weld you can permanently bond gypsum, lime putty, acoustical plaster and cements to themselves... or directly to any sound surface... even glass. Applied with brush, roller or spray gun. No costly surface preparation. You cover Plaster-Weld with new material as soon as touch dry (about an hour). In case of Marriott Motor

Hotel, shown above and billed as the "World's Largest Motel." Plaster-Weld was sprayed on smooth concrete ceilings to bond lime putty plaster finish. Architect: Joseph G. Morgan, Washington; General Contractor: Charles H. Tomkins Co., Inc., Washington; Plastering Contractor: Novinger Company, Inc., Brentwood, Maryland.

A Plaster-Weld bond is ageless... never lets go! Plaster-Weld is approved by F.H.A., New York City Board of Standards & Appeals, and protected under U.S. Patent No. 2,760,885. For technical data, and job proof, see Sweet's, or write us direct. Address Box 5756 Z, Larsen Products Corp., Bethesda, Maryland.

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For your convenience, we have developed 5-page work sheet copies of specifications for bonding agents, edited by Ben H. Dyer, A.I.A., specifications consultant of Bethesda, Md. Get yours today. Simply mail coupon.

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Company.....

Street Address.....

City..... State.....

Circle 12 for further information

# products, equipment, materials

water or domestic hot water. Also does not interfere with normal operation of domestic hot water circuit. Pre-wired, fast-acting boiler controls designed to provide quick response to demand. Available as optional equipment of line of residential hot-water boilers ranging in capacity from 100,000 to 600,000 BTU/hr.

AIA file no. 30-C

MFR: EDWARDS ENGINEERING CORP.  
Circle 62 for further information

## HVAC CONTROLS

### Three-way valve

MFR'S DESCRIPTION: Jackes-Evans Mfg. Co. announces the latest addition to its "J-E" line of solenoid valves, type #701.

USES: water control for fan-coil units, using forced circulation chilled or hot water for individual room air conditioning.

SPECS/FEATURES: in response to thermostat demands, the valve diverts water either through heat exchange coil or by-passes coil when temperature requirements are met. Mfr states it provides accurate control of temperature in place of ordinary heating and cooling. Capacity range is from 1/2 gpm to 10 gpm with maximum operating pressure of 25 psi (with 200 psi static). Separable solder flange facilitates installation. Selection said to be simple and first cost low. Unit utilizes pilot operation and diaphragm application, providing maximum flow at pressure and eliminates fluid hammer and electrical hum. Technical data available.

AIA file no. 30-C-2

MFR: JACKES-EVANS MFG. CO.  
Circle 63 for further information

### Air pollution control

MFR'S DESCRIPTION: "Dorex", a product of Connor Engineering Corp., acts like a gas mask to absorb destructive air-entrained pollutants.

USES: industrial applications.

SPECS/FEATURES: among industrial processes, gases for which protection of at least 95 per cent efficiency is provided, are sulfur components, organic peroxides, nitrogen oxides, and chlorides. Recent use in Linden, N. J. generating station where the installed "Dorex" activated carbon air purification equipment is used to protect the collector rings of the power station's large generators.

AIA file no. 30-D-3

MFR: CONNOR ENGINEERING CO.  
Circle 64 for further information

## HARDWARE

### Adjustable railings

MFR'S DESCRIPTION: available from Hollaender Mfg. Co. are *Speed-rail*, adjustable, slip-on type railing fittings.

USES: metal railings for various installations.

SPECS/FEATURES: each unit is reported capable of performing function of several conventional threaded or welded fittings in railing, safety enclosure and frame constructions. *Speed-rail* can be used alone or combined with rigid fittings. Are stated to eliminate templates and jigs required in welded or threaded installations, and also pipe bending. Composed of corrosion-resistant, aluminum and magnesium alloy, units have 35,000 to 45,000 psi tensile strength, and elongation of 11 to 15 per cent according to mfr.

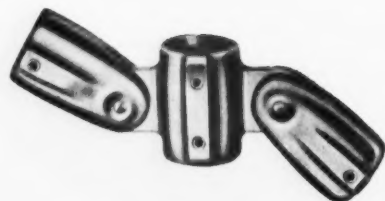
AIA file no. 14-D-4

MFR: HOLLANDER MFG. CO.  
Circle 65 for further information

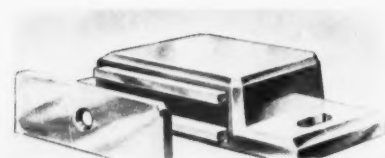
### Magnetic catch

MFR'S DESCRIPTION: durable magnetic cabinet door catch is offered by C. Hager & Sons Hinge Mfg. Co.

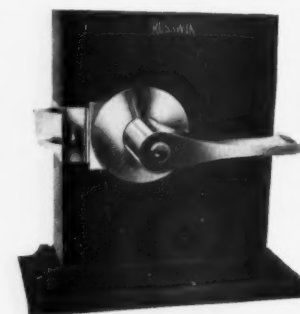
USES: wood or metal cabinet



65



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67



68

doors, including both interior and exterior installations.

SPECS/FEATURES: catch is colored beige, and is 2" x 7/8"; designed to maintain firm closure of cabinet doors with 12-lb magnetic pull. Mfr. claims savings in installation time and durability of product because of absence of all moving parts.

AIA file no. 27-B

MFR: C. HAGER & SONS HINGE MFG. CO.  
Circle 66 for further information

## Lever handle

MFR'S DESCRIPTION: Russwin announces the *Beaulev* lever handle.

USES: office building door installations.

SPECS/FEATURES: *Beaulev* is most recent addition to *Uniloc* series of factory assembled locksets for installation in standardized door cutouts. Latchbolts have full 5/8" throw and outside locksets are equipped with deadbolts. Lever handles, with thumb groove to fit user's hand, are available in assorted finishes.

AIA file no. 27-B

MFR: RUSSWIN  
Circle 67 for further information

## Door hardware

MFR'S DESCRIPTION: *Surfacet* hardware for interior doors is available from The Stanley Works.

USES: residential and commercial installations.

SPECS/FEATURES: product is designed for use with interior doors which fit over opening rather than inside it. Turning knob has been eliminated; only push-pull action necessary for door operation. Units fit any size wall or door construction down to 1" thickness.

AIA file no. 27-B

MFR: THE STANLEY WORKS  
Circle 68 for further information



## THE ANATOMY OF A NEW PROJECT

# preview: 6

GIANTS STADIUM, SAN FRANCISCO  
SAN FRANCISCO PARK & RECREATION COMMISSION

JOHN S. BOLLES, AIA

E. ELMORE HUTCHISON

CHIN AND HENSOLT

H. W. EAGLESON

LYLE E. PATTON

CHARLES L. HARNEY, INC.

project

client

architect

civil engineer

structural engineers

mechanical engineer

electrical engineer

general contractor



View of model (photo by Pirkle Jones, San Francisco) overlooking home plate to the outfield. Site plan below shows arterial access to the stadium and the surrounding parking fields.



### General description and site

The *Giants Stadium* in San Francisco is designated a municipal structure to serve primarily as the home field of the *San Francisco Giants*, while maintaining adaptability for such other uses as football games and pageants. *San Francisco Stadium, Inc.*, has leased the 77.37 acre site for a fifty-year period, and subleased the playing field and stadium to the *National Exhibition Co.*, owner of the *San Francisco Giants*, for those baseball seasons of the 35 years immediately subsequent to the project's scheduled completion date in September, 1959. Located on the easterly slope of *Candlestick Point*, a projection of *Bay View Hill* that extends into the *Bay* near the *San Francisco-San Mateo* county line. Fifty-nine acres of the site provide parking facilities for approximately 300 buses and 8,400 private cars.

### Design features

A pear-shaped, contemporary structure, occupying eight acres, the project is the first major league baseball stadium to be constructed entirely of reinforced concrete. Both a desire for economy and the *San Francisco Building Code* influenced the decision to use this material for an all fireproof structure. The design and construction features were gleaned from studies of stadia in this country and abroad. Extensive use was made of precast and prestressed techniques, but only where actual cost comparisons would indicate a savings in favor of this procedure over conventional poured-in-place concrete. Almost every major structural element in the stadium was designed on this optional basis, and the contractor chose the most economical method after considered analyses and tests. This designer-builder cooperation was embodied throughout the project, producing the best contemporary use of concrete, based on the latest design thinking and the most economical use of material and equipment.

The stadium is cradled in the slope of *Bay View Hill* and the 300' crest of the hill overlooks the playing field. Three levels, *Lower Tier*, *Loge Tier* and *Upper Tier*, are in evidence; the *Upper Tier* is extended and the extension roofs over the *Loge Tier* and the last twenty rows of the *Lower Tier*. A concrete shell baffle has been placed behind the last row of seats on the *Upper Tier* to provide wind protection. Of the four regular entrances to the stadium, three are at street level, and the fourth is a bridge entrance to the *Loge Tier* for the use of invalids, press, etc. Movable bleachers have been placed on the perimeter of right and left fields.

### Plan elements

Three concourses are on the outside of the stadium, curving around its entire length: the *Main Concourse*, the *Loge* or *Promenade Concourse*, which is 10' above, and the *Upper Concourse*, 18' above the *Promenade Concourse*. The width and location of the entrances, including ramps and corridors, and other facilities in these passageways, were determined by the necessity of a logical and orderly flow of persons. The four regular entrances to the stadium are on the *Main Concourse*, which is 22' wide and 10' to the partial roof—the outer half is exposed. Two entrances are at the opposite ends and the other two approximately spaced in between. All are set at street level, except that which faces south. Along the inner wall or playing field area are 33 aisles, all at *Main Concourse* level and spaced 48' apart. They open into main aisles which lead to seats on the lower tier. The aisles behind the home plate area are 7'-6" in width, and those in the left and right base areas are 6'. Directly opposite the entrances are four ramps leading upward to the *Promenade* and *Upper Tiers*. These ramps are 10' wide and rise one foot in every ten. In the spaces between the aisles and ramps are the concessions and vending stalls, men's and women's rest rooms, ticket windows and police and first-aid stations. The 200' bridge entrance, for the use of invalids, press, guests, etc., opens onto the center of the *Promenade Concourse*, which is roofless and 12' in width. This level contains four lobbies, 18' wide and 48' long, which open into the connecting aisles to the loge seats. The exterior curve of the

stadium, over-all, is 1,675' and the inner curve is 1,000' in length. The grandstand is 164' deep. Exterior curve of the bleachers is 675', and the inner curve, 460' in length. The *Upper Concourse* is 13' wide and the floor of the seating area overhead serves as a roof. Average height of the ceiling is 18'. Along the inner wall are 26 corridors, spaced 32' apart, which lead into the 6' cross-aisles that divide the box seats from general admission seats. Location of the corridors, 28' long and 4' wide, is keyed to seat blocks.

### Playing field design criteria

Within the stadium, the actual size of the playing field is 4.25 acres, or 170,800 sq. ft. Fourteen inches of top soil has been placed on a red rock base. The pitcher's mound is 16.3' above sea level; bases 14', and the outfield 11'-6". The prevailing winds are from the southwest, tending to blow northeast toward center and right fields. The 300' slope of Bay View Hill immediately behind the stadium acts as a windbreak. The baseball area exceeds the minimum size prescribed by official regulations. Center field is 26° northeast of home plate, and the center field fence is 420' distant. Third base is 19° northwest of home plate, and both the first and third base foul lines are 325' distant. Of regulation size, the football field is on the west side of the area. Goalposts run north and south; northern end zone is 30' from first row of seats, western boundary 30' from the first row of seats of west side of stadium, and eastern boundary 30' from bleachers. Two dugouts, both 32' x 6', have been provided; the *Giants'* opposite first base, and that for visiting teams toward third.

### Facilities provided

Facilities contained on the *Promenade Concourse* section include: dressing rooms and lockers for vendors and usherettes, public rest rooms, press photo labs and storage, executive offices of the *Giants*, press room which fronts on the field behind home plate, club with bar and restaurant and the press lounge. Three television broadcast booths are in this area, in the press box and opposite first and third bases. On the *Upper Concourse*, in the areas along the inner wall between the corridors and ramps, are concessions and vending booths, wash rooms for men and women, and storage facilities.

### Seating plan

The total seating capacity for baseball games, including 5,000 movable bleacher seats in center and right fields, is approximately 45,000. Including 15,000 movable bleacher sets, the total capacity for football games is approximately 50,000. The *Lower Tier* contains 44 rows of seats, 22 of which are boxes with a capacity of 8,038 in the forward section, and 22 rows of general admission to the rear, seating 18,048. The distance from the last row of seats to the pitcher's mound is 270'; to home plate, 205'. The first row is 4'-8" above the playing field and the last row is 30'-8". Including steps, the rise of rows is 8" above one another from first to last row. Unusually wide spacing of seats assures all spectators a clear view of the playing area, unobstructed by the tier supporting columns. On both sides of the press-radio-television box, on the *Loge Tier*, 400 seats are available on a rental basis. The distances from this tier to the pitcher's mound and home plate are 213' and 150', respectively. Press box capacity ranges from 75 to 90 persons, including radio and television equipment. In the *Upper Tier*, 8 rows of boxes forward provide 2,865 seats and 22 rows of general admission to the rear, 11,001. Here the distances are 302' and 238' from the pitcher's mound and home plate to the last row of seats. The first row of the *Upper Tier* is 17' above the area of play, and a rise of 16" in the rows results in a distance of 43' in the last row. Cross aisles are 6' wide; vertical aisles, 3'-6".

### Structural information

The basic framing system consists of balanced cantilever trusses spaced approximately 24' apart. At the lower level, the steel columns supporting these frames are spaced approximately 48', at alternate frames. The columns, whose size and shape were dictated by architectural and sightline considerations, are 12" round solid steel shafting; 10" x 10" laminated steel plate columns were considered but abandoned because of their more complicated connections and greater cost. Although the columns will not take any earthquake stresses, they do allow for bending movements from structural expansion. At the upper and nominal levels, the floor consists of 30" pan joists with 3" and 2½" slabs. These span 24' between the cantilevered truss frames. The upper section of the truss frames is prestressed. The "A" frames are precast and support the upper boomerang frames supporting the upper deck seating and wind baffle. The wind baffle consists of double-T precast and pretensioned units with 2" slabs and 6" stems spanning 24'. Since this is an irregularly shaped structure, the seismic coefficient of 10 per cent plus 25 per cent of occupant load was used. The seat decks and precast wind baffle roof are connected by matching steel plates

and dowels to form a horizontal diaphragm which transmits lateral forces to the shear walls in both the transverse and longitudinal directions. The walls are 12" thick with very heavy tie-downs for overturning. A minimum of 3" separates these units for seismic considerations.

### Prestressing factors

The upper seat units are prestressed and precast; they are L-shaped with 5" x 16½" beams or stems, and a slab varying from 3" to 2½" in thickness. While direct cost comparisons between prestressed and non-prestressed design shows a standoff for the units themselves, the savings in the net cost were effected because of the lesser amount of concrete used in the prestress design, resulting in a lighter frame and smaller footings. Since concrete is under constant compression in prestress, temperature and shrinkage cracks were minimized by this prestressing action.

In compliance with the City Building Department of San Francisco, as a minimum to equal in fire-resistance a conventional four-hour job, a 1% coverage of the steel was provided. Prestress features figure again in the front wall directly over the steel columns. Where no openings occur, the wall acts as a girder and no particular problems result. In providing access from the press level to the restaurant and bar, however, large openings occur. The 23' deep girders spanning 48' were, in effect, reduced to approximately 7' in depth.

Due to the magnitude of the loads involved, conventional concrete was not practical. Conventional prestress on this depth required approximately 5½" of prestressed steel. Under a conventional prestressed system also, proper end anchorage locations would have been difficult to place. By using an unconventional draped-shape prestressing tendon, the vertical component of the cable was able to relieve the column load, thus affording a maximum economy in design. The final prestress design in this beam shows only two 1½" tendons, or slightly less than three square inches of prestressing steel, plus nominal mild steel. The prestressing force along the tendons is actually absorbed and dissipated so that there is very little prestress in the girder. This forms a complete departure from conventional prestress design where this force normally supplies the major prestressed force.

From a construction viewpoint, the problem arose of placing sufficient deadweight on this wall so that prestressing operations could proceed without delay. In order not to impose too much tension on the top side of the prestressed girder, a decision was reached to design the prestress for 100 per cent of dead load plus 50 per cent of live load, as it was felt that this was the maximum amount of prestress that could be safely put into this girder. The remaining 50 per cent of the live load is taken by mild steel in the concrete girder. Prestressing takes place with 70 per cent of dead load on this girder. This partial live load concept is thought to be unique.

The frames too, embody prestress features. The top members of these trussed frames developed very high tensile stresses in the concrete which would have been undesirable. Again draped-shape tendons, rather than a conventional straight wire, were used to greatly reduce this tension in the upper member. Besides this function, the tendons reduced the bending moment by approximately 35 per cent. The entire project totals approximately 23,000 yards of concrete, of which 3,000 yards are precast units. A total of 1,700 tons of reinforcing steel were used, and 10 tons of prestress tendons for cast in place beams.

### Lighting

Three towers with two standards each and with 100 footcandles have been placed along the perimeter of the outfield; right, center and left fields are uniformly lighted. Four towers with 150 footcandles have been placed behind the stadium, uniformly lighting the infield. Two of these fixtures have two standards and the remainder three.

### Heating

*Lower Tier*: radiant heat under approximately 30,000 seats in main and upper levels.  
*Loge Tier*: radiant heat equipment throughout.  
*Upper Tier*: radiant heat for the first eight rows.

### Cost

Total cost for the project is \$15,000,000, of which \$5,000,000 will be expended to develop the site, including parking areas and new streets, and \$6,000,000 for the structure.

# literature

Literature cited in this department is available from various manufacturers and associations free of charge. To obtain copies, circle the keyed numbers on the reader service cards facing pages 8 and 32.

## Plastic unit wall

Current brochure of the Kalwall Corp. describes panel unit wall constructions of plastic and aluminum for flexibility of architectural design. Units are modular, interconnected structural-component wall systems which eliminate heavy mullions and floating panels and provide an assembly of many colors and textures, suitable for any type of building. All components are factory fabricated and require only fastening and sealing at site. Mfr claims loading is throughout entire system rather than concentrated solely on mullions. Components are available in any assembly of translucent panels, opaque panels, with sash and louver assemblies. Dimensions, section drawings and specifications stress design freedom. Units have been used in prominent architectural edifices such as Architect Edward Stone's Brussels Fair Pavilion.

AIA file no. 17-A

MFR: KALWALL CORP.  
Circle 70

## Ceramic tile

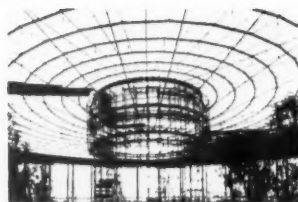
Portfolio of full color room illustrations showing ceramic tile installations has been issued by United States Ceramic Tile Co. Possible aid for architects interested in functional usage of ceramic tile. Line drawings show flexibility in use of color with ceramic mosaics.

AIA file no. 23-A

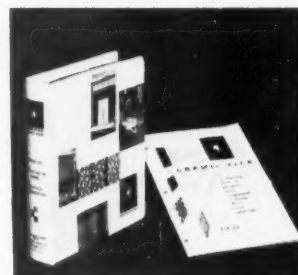
MFR: UNITED STATES CERAMIC TILE CO.  
Circle 71

## Noise control

Recent literature on controlling air conditioning and ventilating systems' noise, describes the "Uni-Silencer" selection chart, copyrighted by Elof Hansson, Inc. Chart is designed to facilitate fitting the right type of



70



71



72



73

silencer to the problem of noise control. Compact, plastic coated card fitting any standard binder, chart is illustrated with three data charts covering high pressure systems, centrifugal fan pressures, pressure drop vs. airflow as well as the different types of "Uni-Silencer" models available. Selection problems are explained and examples of efficiencies given with accurate directions. Chart is based on actual job-performances of installations in office and industrial buildings in recent years. Covers five noise problems and their solutions. (single sheet)

AIA file no. 30-A

MFR: ELOF HANSSON, INC.  
Circle 72

## Concrete slabs

Catalog has been issued by Federal Cement Tile Co. describing lightweight aggregate concrete slabs and planks for all types of roof and floor deck systems. Specification details, data charts and installation drawings are provided for standard "Castlite" slabs, channel slabs, tongue and groove planks, acoustical channel slabs and the recently introduced insulation and acoustical slab, "Insul-coustic." (12 pp.)

AIA file no. 4-K

MFR: FEDERAL CEMENT TILE CO.  
Circle 73

## Vinyl steel

A catalog just released describes "Granco Vin-Cor" as a vinyl-protected galvanized steel. This new idea in protected metal combines a wide variety of high-strength corrugated steel patterns with four corrosive resistance coatings. Product is available in nine standard colors plus metallic green and metallic blue. Other shades available on a project basis. The literature features fire resistance ratings, methods of use, installation procedures and other mechanical prop-

erties. Flashing details, fasteners, sheet details, insulated wall panel details, selection tables, suggested architectural specifications and a table of physical properties are included. (8 pp.)

AIA file no. 12-C-1

MFR: GRANCO STEEL PRODUCTS CO.  
Circle 74

## Ornamental signs

Appropriate signs and inscriptions for building fronts are covered in "Plaques and Letters for Building Facades," issued by the United States Bronze Co. Current catalog illustrates plaques in a variety of lettering on bronze, aluminum, stainless steel, porcelain, nickel silver and galvanized backgrounds. Individual lettering dimensions also included, some with enamel filled letters. (8 pp.)

AIA file no. 15-A

MFR: UNITED STATES BRONZE SIGN CO., INC.  
Circle 75

## Asbestos/cement

Three booklets published by Philip Carey Mfg. Co. describe asbestos and cement composition wallboard, roofing, sidewall and clapboard siding for residential, commercial, institutional and industrial uses. "Ceramco" features baked ceramic type finish in varied colors. Booklets include specifications and uses. Fireproof shingles bear 25 year bond. (8,4,8 pp.)

AIA file no. 12

MFR: PHILIP CAREY MFG. CO.  
Circle 76

## Laminated plastics

Data and specifications file on "Consoweld" laminated plastic for counters, tables, cabinets and shower walls has been published by Consoweld Corp. Material is manufactured in two thicknesses, 1/16" and 1/10", for hori-



# literature

zontal surfaces and wall paneling. Mfr claims surface is unharmed by fruit juices, boiling water, alcohol, oil, grease and common household chemicals. Booklet contains product description, patterns and colors available, specifications, detail drawings of installations and sizes. (14 pp.)

AIA file no. 35-C-12

MFR: CONSOWELD CORP.

Circle 77 for further information

## Fibrous glass

Aluminum and fibrous glass skylights for commercial, industrial and institutional applications are featured in a brochure of the Marco Co. Available models include usage for over curb construction, self contained curb and roof flange, insulating skylights and special shapes and designs. Construction features are explained and photographs of several installations are included. (12 pp.)

AIA file no. 12-J

MFR: THE MARCO CO.

Circle 78 for further information

## Strip lamination

Bestwall Gypsum Co. announces its "Hummer system" of wall board installation, utilizing laminated coating as fastener, thereby reducing number or nail or screw type fasteners in exposed face layer. Method is designed to prevent nail popping, delayed shrinkage and joint beading. Pamphlet contains listings of materials required and assumed advantages. Section drawings show installation methods. (8 pp.)

AIA file no. 19-K

MFR: BESTWALL GYPSUM CO.

Circle 79 for further information

## Wall units

Plywood units for panels, partitions, doors, jalousies, dividers, cabinets, shelving, and similar applications are featured in recent literature of the United States Plywood Corp. Three grades of "Novoply," differing only in surface finish, are offered. Mfr claims product, of three-ply wood and resin construction, retains original dimensions even after exposure to extremes of humidity, temperature and

water. Other features claimed include surface hardness, strength, lightweight and resistance to combustion. Schematic diagrams of installations are included. (20 pp.)

AIA file no. 23-L

MFR: UNITED STATES PLYWOOD CORP.

Circle 80 for further information

## Metal lathing

Supplement no. 1 to technical bulletin no. 14 has been issued by the Metal Lath Mfrs. Assn. Contains section details of typical plans for vertical furring plastered and finished for fire resistive construction. Included are fire resistive ratings from findings by the National Bureau of Standards and Ohio State University. (single sheet)

AIA file no. 20-B-1

ASSN: METAL LATH MFRS. ASSN.

Circle 81 for further information

## Pallet assembly

Bulletin no. 38 of the Wood Research Laboratory, Virginia Polytechnic Institute, reviews and summarizes improved fasteners for better utilization of wood. Includes annular- and helical- threaded bright and hardened nails, wood screws, sheet metal connectors. Improved assemblies and designs of nailing procedures are also contained. Bibliography presented. (44 pp.)

AIA file no. 35-i-17

ASSN: WOOD RESEARCH LABORATORY, VIRGINIA POLYTECHNIC INSTITUTE

Circle 82 for further information

## Wood siding

Insulite Div., Minnesota and Ontario Paper Co., has issued a catalog describing building materials of wood. Catalog contains descriptions, physical properties, recommended uses, advantages, specifications and available types and sizes for primed siding, insulating sheathing, shingle-backer, roof deck, roof insulation and acoustical and decorative tile. Mfr states materials comply with applicable specifications of Federal Specifications, Commercial Standards and ASTM Standards. (12 pp.)

AIA file no. 19-D

MFR: INSULITE DIV., MINNESOTA AND ONTARIO PAPER CO.

Circle 83 for further information

## Central vacuum systems

Designed for commercial, industrial and institutional applications, central vacuum cleaning systems are

covered in brochure issued by the Spencer Turbine Co. System consists of vacuum producer, multi-stage, centrifugal type, and dirt separator, free of moving parts. Successful applications and varied uses are pictured. Technical details and specifications are available. (8 pp.)

AIA file no. 35-J-1

MFR: SPENCER TURBINE CO.

Circle 84 for further information

## STRUCTURAL USES

### Trusses

Two trussed rafter designs prepared for use in component construction have been released from Timber Engineering Co. (Teco). Accommodating spans of 24'-8" and 28'-8", the designs are for a spacing of 24" on centers and a roof slope of 1/2 with a combined live and dead load of 35 lbs. psf. Proper anchorage details with "Trip-L-Grip" framing anchors are shown on each design. Trussed rafters built in accordance with Teco designs require no expensive presses or jigs for proper fabrication and assembly according to mfr. Teco estimates an investment of less than \$200 is needed to set up fabricating facilities, and trusses can be either shop or job assembled. Complete fabricating details are available. (single sheet)

AIA file no. 19-B-3

MFR: TIMBER ENGINEERING CO.

Circle 85 for further information

### Slab insulation

Spun mineral wool insulation for concrete floor slabs and crawl spaces is covered in a recent publication of the Baldwin-Hill Co. "Perimsul" is a rigid material, impervious to rot, decay, damage by termites, fungi and water, according to mfr. Bulletin lists advantages, properties and related data of product, and section drawings show typical installations. (4 pp.)

AIA file no. 37-B-3

MFR: BALDWIN-HILL CO.

Circle 86 for further information

## CURTAIN WALLS

### Aluminum units

Current literature of Ware Laboratories, Inc., describes line of aluminum curtain walls for varied installations. Bulletin contains section drawings of technical and installa-

tion details, architectural specifications and charts of sizes and dimensions. (8 pp.)

AIA file no. 17-A

MFR: WARE LABORATORIES, INC.

Circle 87 for further information

## Curtain walls

Literature of the F. C. Russell Co. features advantages and technical data on "Rusco" curtain walls. Mfr claims greater architectural design freedom, rapid erection and permanence of construction result from use of product. Detailed specifications and diagrams of installations are included, with chart of available colors. (5 pp.)

AIA file no. 17-A

THE F. C. RUSSELL CO

Circle 88 for further information

## LIGHTING

### Control systems

Superior Electric Co. describes line of light control systems in recent bulletin. Systems are designed to provide proper light intensity to suit individual needs in such installations as schools, offices, libraries, hospitals and factories. Discussed are light sources, direction and diffusion of light rays, color and texture of environment and shadows. Calculations are explained using factors of foot-candles, reflectance and footlamberts. Wiring and connection diagrams and rating and specification charts are included. (28 pp.)

AIA file no. 31-F-33

MFR: SUPERIOR ELECTRIC CO

Circle 89 for further information

### Floodlighting

The General Electric Co. has published "The Engineering Aspects of Architectural Floodlighting," giving basic engineering details for use of floodlighting to enhance appearance of commercial type structures. Photographs show examples with charts providing photometric data and recommended footcandle levels and distribution. (8 pp.)

AIA file no. 31-F-22

MFR: GENERAL ELECTRIC CO.

Circle 90 for further information

### Acoustical lighting

Contrex Co. covers "Soundsheet," translucent, acoustical element, in recent bulletin. Product is described as plastic laminate material, combining acoustical properties with illumina-

tion characteristics, and designed for such installations as wall to wall and area lighting systems, space dividers and screens, lighting fixtures and pre-formed acoustical units. Bulletin contains full listing of suggested applications as well as sound absorption reports, sound reduction chart, photographs of installations and other technical data. Included also are specifications and dimensional information. (4 pp.)

AIA file no. 31-F-2

MFR: CONTREX CO.  
Circle 91

### Lighting report

Report, designed as an aid to lighting design, has been published by Holophane Co., Inc., as a supplement to their current "Datalog," Engineering data and footcandle values contained cover industrial, institutional and commercial installations. Intended to serve as guide to recommended practice. (2 pp.)

AIA file no. 31-F-2

MFR: HOLOPHANE CO., INC.  
Circle 92

### ARCHITECTURAL METALS Omnibus catalog

Catalog no. 8 published by Julius Blum & Co., Inc., is a comprehensive and handsome presentation of their stock components for fabrication and assembly of architectural metal work, including railings, treillage, moldings in functional shapes, saddles, nosings, ornaments, hardware and machinery. Featured is square and rectangular tubing of steel composition, mechanical welded, for column and curtain wall usage. Elements of sections, stock sizes and ordering data are included, in addition to very carefully illustrated and dimensioned information. Graphic presentation is unusual and meticulously handled; catalog should serve as a worthwhile reference source in the office. (138 pp.) AIA file no. 15

MFR: JULIUS BLUM & CO., INC.  
Circle 93

### Wall systems

The Michaels Art Bronze Co. features metal wall systems, architectural castings and vertically pivoted windows in recent literature. Wall systems, available in aluminum, bronze and stainless

steel, comprise mullion, wall panel and window unit. Three types are illustrated in section drawings. Mfr guarantees construction and workmanship of products for two year period. (4 pp.)

AIA file no. 17-A

MFR: THE MICHAELS ART BRONZE CO.  
Circle 94

### Aluminum uses

Olin Mathieson Chemical Corp. has issued an attractively presented booklet detailing salient features of aluminum for architectural uses. Designed to aid the architect to fully implement aluminum for greater design freedom, booklet contains various advantages of the metal and numerous, clearly presented charts, affording technical information and specifications on tempering, tensile properties, shearing strengths, etc. Typical applications and recommended alloys are given for anodized sheets, castings, extrusions, fasteners, sheet metal and others. Coating guide for anodization is included in comprehensive treatment of subject. (12 pp.)

AIA file no. 15-J

MFR: OLIN MATHIESON CHEMICAL CORP.  
Circle 95

### Aluminum units

Brochure file on Reynolds "Lifetime" aluminum commercial building products has been published as a service to architects and engineers by Reynolds Metals Co. File folder contains separate brochures on Reynolds commercial acoustical systems, corrugated roofing and siding, field-assembled insulated wall system, roof deck, ribbed embossed siding and V-beam roofing and siding. Six building products are designed for commercial, industrial and institutional buildings. Information given in brochures includes uses, advantages, erection methods, specifications and accessories. (24 pp.)

AIA file no. 12-C; 17-A; 39-B

MFR: REYNOLDS METALS CO.  
Circle 96

### SEALERS/WATERPROOFING Polymer sealer

Literature issued by Presstite Div., American-Marietta Co., describes a polysulfide polymer, two-component,

**With Zonolite, you  
never doubt you've  
specified the  
very best!**



**Zonolite  
Insulating Concrete**

**over galvanized steel decks  
saves time...labor...money!**

You know you are insuring your clients' long-range satisfaction when you specify Zonolite vermiculite concrete for roof decks and roof insulation. Such roofs are speedy to erect, monolithic, durable, firesafe, of good appearance and adaptable to any design. At the same time *they are low in cost and low in maintenance.* The system of construction shown here is just one of many made possible by using Zonolite vermiculite concrete. For details of various Zonolite roof deck systems, mail coupon, no obligation.



**Job reports reveal  
thousands of dollars  
saved when a Zonolite  
system is specified over  
alternate proposals**

One recent job report showed a \$38,000 saving with Zonolite, when compared with an alternate proposal!

**ZONOLITE OFFERS YOU PRACTICAL ASSISTANCE WITH  
ITS NATIONWIDE NETWORK OF CONCRETE SPECIALISTS  
AND EXPERIENCED ROOF DECK APPLICATORS**

**MAIL COUPON FOR COMPLETE DATA FILE  
AND INFORMATION—NO OBLIGATION**

ZONOLITE COMPANY, Dept. AEN-69

135 S. La Salle Street, Chicago 3, Ill.

Please send me your new booklet CA-43 on Zonolite Insulating Concrete Roof Systems.

Name \_\_\_\_\_

Firm Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Circle 13 for further information



# literature

cold-applied sealing compound designed for sealing joints in Portland cement concrete exposed to the action and operational requirements of jet aircraft. Material, "Presstite #55-MIL," is described as a modern sealer that: (1) resists jet blast, heat, fuel and oil; (2) cures quickly; (3) dries track-free within approximately 60 minutes after application. Other physical chemical characteristics also listed, including sealer's high cohesive strength, ductility adhesion and resistance to repeated freeze-thaw cycles. (4 pp.)

AIA file no. 4-N

MFR: PRESSTITE DIV., AMERICAN-MARIETTA CO.

Circle 97

## Floor seals/coatings

Four recent additions to line of flooring finishes has been announced in literature by L. Sonneborn Sons, Inc. "Sonolastic" sealing compound is a liquid composition, free from volatile components, consisting of sulfarized, synthetic rubber polymers. "Kure-n-seal," blend of synthetic resins in fast evaporating solvents, contains no oil or saponifiable materials. "Sonoplex" is epoxy resin catalyst system, resistant to chemical spillings and fumes, traffic and abrasion. For interior, exterior and immersion exposures, "Epolith" is another chemical resistant veneer. (14 pp.)

AIA file no. 7-D; 3-B-1; 25-B-6

MFR: L. SONNEBORN SONS, INC.

Circle 98

## Sealing strip

Sealant, "Pressureseal," is treated in literature issued by the Presstite Div., American-Marietta Co. Product is described as combination of two proven products—an elastic compound tape and a neoprene "core." United in one product, synthetics provide a lasting seal and resilient cushion according to mfr. (single sheet)

AIA file no. 17-J

MFR: PRESSTITE DIV., AMERICAN-MARIETTA CO.

Circle 99

## Expansion joints

Rubber waterstop, "Aquastop," is the

subject of literature issued by the Presstite Div., American-Marietta Co. Product has been engineered in both material and design to provide watertightness in concrete expansion, contraction and construction joints, even under hydrostatic pressure. Mfr lists tensile strength, flexibility and elasticity among product characteristics. Available sizes and styles of product are included with illustrations of typical installations and information on field-splicing, molded accessories such as tees, unions, crosses, and ells, and standard specification information covering materials, installation requirements, sampling and testing. (4 pp.)

AIA file no. 7-C and 4-E-11

MFR: PRESSTITE DIV., AMERICAN-MARIETTA CO.

Circle 100

## Waterproofing

AIA file bulletin on polyethylene sheeting for construction purposes is offered by Kordite Corp. Bulletin describes uses and specifications of polyethylene sheeting for concrete floors, basements, foundations, windows, masonry and other construction applications. Additional data is given on properties and features as well as on available sizes. (4 pp.)

AIA file no. 7-A

MFR: KORDITE CORP.

Circle 101

## ACOUSTICS

### Acoustical systems

Metal suspension systems for acoustical tile and gypsum board backed acoustical tile is the subject of a booklet issued by Famco Div., James A. Phillips, Inc. Each tile unit is mechanically supported and removable; ceilings may be suspended or attached to metal furring, steel joists, bar joists, wood joists, steel or concrete. Both systems are accessible, sound reducing and adaptable in that they can support troffer lighting. Assembly and installation details are illustrated and specifications are included. (8 pp.)

AIA file no. 39-B-1

MFR: FAMCO DIV., JAMES A. PHILLIPS, INC.

Circle 102

### Acoustical tile

The Celotex Corp. discusses sound reduction in schools and colleges in recent brochure. Areas of unnecessary

noise and suggested remedies are described through text and illustrations, and suggestions for effective acoustics are offered. Sound conditioning tile, available in varied finishes and modular units is also contained. Celotex translucent ceiling of lightweight plastic panels are featured to foster efficient lighting. (12 pp.)

AIA file no. 39-B

MFR: THE CELOTEX CORP.

Circle 103

### Acoustical material

The Insul-Coustic Corp., in recent literature, announces use of their "Sound Barrier" to combat sound transmission over the tops of office partitions extending only to the suspended ceiling. Material is combination of asbestos, aluminum and fibrous glass, and can be cut to fit around ceiling obstructions. Bulletin illustrates problem and solution in section drawings. Mfr claims average sound transmission loss at 40 db. (single sheet)

AIA file no. 39-B

MFR: INSUL-ACOUSTIC CORP.

Circle 104

## GYM USES

### Backstops

Horn div. Brunswick-Balke-Collender Co. announces its line of basketball backstops in current catalog. Illustrated are glass, steel and wood boards in fan and rectangular shapes. Units are of wall, ceiling and floor type which fold into minimum space when not in use. Specifications included. (12 pp.)

AIA file no. 35-F-5

MFR: HORN DIV., BRUNSWICK-BALKE-COLLENDER CO.

Circle 105

### Athletic equipment

Basketball backstops for interior and exterior installations are described in brochure issued by Wayne Iron Works. Brochure illustrates wall and ceiling mounted backstops in stationary, gate and fold-up types. Technical data and specifications are available. (4 pp.)

AIA file no. 35-F-5

MFR: WAYNE IRON WORKS

Circle 106

### Spectator seating

Recent literature of Safway Steel Products, Inc., describes its telescoping seating units for gymnasium in-

stallation. Eight structural steel members per row support each standard 16' section. Booklet includes construction details, section drawings and charts explaining dimensions, capacities, specifications and planning details. Mfr claims increased safety, greater comfort, floor protection and unobtrusive appearance as advantages. (16 pp.)

AIA file no. 35-F-11

MFR: SAFWAY STEEL PRODUCTS, INC.

Circle 107

## PARTITIONS

### Folding partitions

Folding panels for greater utilization of school space are announced by Horn Div., Brunswick-Balke-Collender Co., in recent publication. Panels are available in roll duck, plywood veneer, aluminum and colored vinyl material. Automatic electric and manual operations are available. Booklet contains architectural specifications and diagrams of installations. (12 pp.)

AIA file no. 35-H-6

MFR: HORN DIV., BRUNSWICK-BALKE-COLLENDER CO.

Circle 108

### Office partitions

Exec-units Partitions div., General Plywood Corp., describes panels for partitioning offices in recent brochure. Partitions are available in natural walnut, gray, green and tan, equipped with leveling device, floor shoes and "stressed skin" design for impact resistance. Installation diagrams are included. (4 pp.)

AIA file no. 35-H-6

MFR: EXEC-UNITS PARTITIONS DIV., GENERAL PLYWOOD CORP.

Circle 109

## SPECIAL FURNITURE

### Prefabricated cabinets

The 1959 Storgewall manual features handsome and effective presentation of prefabricated cabinets for various installations. Explicit sectional drawings show construction details, suggested uses and design principles of units. Flexibility of system is evidenced by such various applications as the recently added "Classroom Series," with units for wardrobes, bookcases, supply materials, etc. Ring binder is convenient and comprehensive catalog



of line of prefabricated units. (108 pp.)

AIA file no. 17-D

MFR: BOYD-BRITTON ASSOCIATES

Circle 110

### Seating units

Table seating equipment for schools and institutions is described in a brochure recently published by Sico Mfg. Co., Inc. Six recent additions are featured in separate folders detailing specifications of individual units. Literature describes portable folding tables, designed to implement multiple use of space, rectangular table and bench combinations of various lengths and portable units of round, square or rectangular shapes. (16 pp.)

AIA file no. 35-C-3

MFR: SICO MFG. CO., INC.

Circle 111

### WALL FINISHES

#### Plywood panels

Plywood paneling for commercial and residential installations, in eight finishes, is announced in current literature by Roddis Plywood Corp. Choice of constructions includes veneer core, lumber core, banding and bending construction, among others. Architectural specifications, installation and wainscoting details are shown in photographs and section drawings. (12 pp.)

AIA file no. 19-F

MFR: RODDIS PLYWOOD CORP.

Circle 112

### Wallcovering

"Bolta-Wall," vinyl wall covering, is described in brochure of the General Tire & Rubber Co. Available in varied colors and patterns, product is intended for home and office use. Brochure furnishes physical characteristics and architectural specifications for fire retardant material. (4 pp.)

AIA file no. 28-C

MFR: GENERAL TIRE & RUBBER CO.

Circle 113

### Various features

Curon div., Curtiss-Wright Corp., announces "Curon," a soft wall covering material having sound absorbing, insulating and decorating qualities, in current literature. "Curon" tiles are available in 24 colors and variations, in  $\frac{1}{4}$ " thickness, in sizes up to 72"

wide. Mfr claims tiles are also flame, moisture and fungus resistant and require simple maintenance. Application data is given. (4 pp.)

AIA file no. 28-C

CURON DIV., CURTISS-WRIGHT CORP.

Circle 114

### SURFACING MATERIALS

#### Surface treatments

Brochure containing application and test data on "Kure-n-seal," for curing, sealing and dustproofing newly poured concrete surfaces in one operation has been issued by building products div. of L. Sonneborn Sons, Inc. Product is a blend of synthetic rubber resins in fast evaporating solvents, which produces transparent, hard glossy film to protect floor from traffic abrasion, water spillage, mild acids and alkalis. Applied to freshly laid concrete to promote water retention and complete hydration of cement. Mfr states product is one operation curing compound and sealer for concrete floors, and a sealer to minimize staining on terrazzo, concrete and patios. (4 pp.)

AIA file no. 3-B-1; 25-B-26

MFR: L. SONNEBORN SONS, INC.

Circle 115

### Floor materials

Heavy-duty flooring materials are described in a bulletin issued by Walter Maguire Co., Inc. Text and illustrations describe paving, patching, grouting materials and brick, all emery-based, and bonding and curing agents. Included is a formulation with emery aggregate designed for heat resistance, a form of corundum which is second only to the diamond on Mohs' Scale of Hardness. (4 pp.)

AIA file no. 23

MFR: WALTER MAGUIRE CO., INC.

Circle 116

### KITCHEN EQUIPMENT

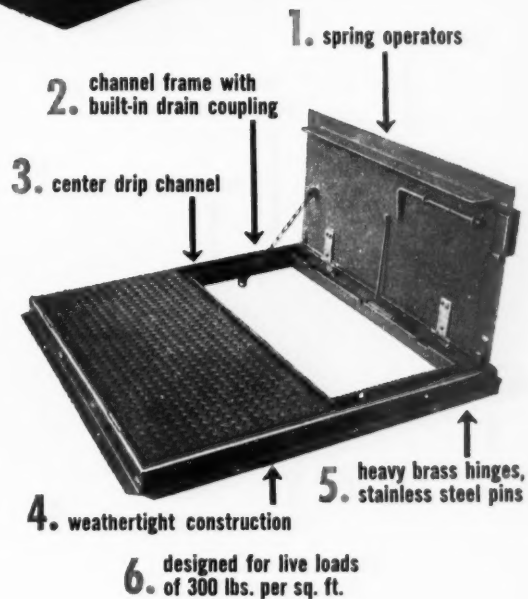
#### Refrigerators

Recent catalog of The Bastian-Blessing Co. describes refrigerators and similar units. Equipment includes refrigerated bases, self-contained service refrigerators and special hamburger dispenser. Units are stainless steel and have contoured front edge to line up with other units in company's line of soda fountains, fast food service and cafeteria equipment. All bear

## SIDEWALK DOORS...

# 6

## WAYS BETTER



Choose Bilco, the *truly modern* sidewalk door — specify with confidence in Bilco lifetime quality. Bilco sidewalk doors are available in a variety of sizes, in single- or double-leaf models, in standard or special dimensions. All Bilco doors are weather-tight — and all swing open smoothly and easily because they are spring-balanced.



# Bilco®

See our catalog in Sweet's or write for complete information.

### HORIZONTAL SPRING-OPERATED DOORS

The Bilco Co., New Haven, Conn., Dept. A16  
Please send me your new catalog on special service doors.

Name \_\_\_\_\_  
Firm \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

Circle 14 for further information

# literature

the Seal of Approval of the National Sanitation Foundation. (8 pp.)

AIA file no. 30-F-6

MFR: THE BASTIAN-BLESSING CO.  
Circle 117

## Refrigerators

A line of porcelain or stainless steel refrigerators for commercial, military, industrial and institutional applications is described in literature of Koch Refrigerators, Inc. Models available include self-contained and remote with condensing units mounted on top or in base. Stainless steel cabinets in four widths and two depths are also offered and bear a five year warranty. (4 pp.)

AIA file no. 30-F-6

MFR: KOCH REFRIGERATORS, INC.  
Circle 118

## Steel kitchens

Literature from St. Charles Mfg. Co. contains dimensional details, specifications and construction details on a line of custom-built steel kitchens. Base and wall units, tall units, sink tops and counters and units for built-in appliances are all available in various finishes and colors. Accessory equipment is also covered. (32 pp.)

AIA file no. 35-C-12

MFR: ST. CHARLES MFG. CO.  
Circle 119

## ELECTRIC EQUIPMENT

### Light panels

Current booklet of Westinghouse lamp division announces "Rayescent" panels for such commercial applications as elevator signals, lighted shelves, decorative lighting, signs and automotive interior lighting. Panels use no filaments, gas or metallic vapors, produce practically no heat, consume a negligible amount of electric current and produce a completely diffused light with no special fixtures or baffles required, according to mfr. "Rayescent" lamp consists of a sheet of glass with an electrical conductive coating and a phosphor layer. When voltage is applied, light is produced by the phosphor. Booklet lists available lamps in standard sizes, ranging from 2" x 2" to 24" x 24", in green, blue and yellow.

Also included are technical data and graphs covering lamp operating frequency, voltage effects, maintenance and power consumption. (4 pp.)

AIA file no. 31-F-23

MFR: WESTINGHOUSE LAMP DIV.  
Circle 120

### Air circuit breakers

Current literature of the General Electric Co. describes line of low voltage circuit breakers which mfr claims are able to protect wide range of equipment including feeder and branch circuits, lighting transformers, welding, high-frequency equipment and busway feeders. Brochure includes features, operation and installation details of breakers, in addition to charts and diagrams of ratings and operating currents. Specifications and dimensions are presented. (20 pp.)

AIA file no. 31-D-44

MFR: GENERAL ELECTRIC CO.  
Circle 121

### Power protector

Recent bulletin from the General Electric Co. presents type LB-1, low voltage power protector, designed for service entrance protection and switching; can be used as heavy duty feeder protective and switching device. Principal application is for large commercial buildings where power is supplied at 480 volts or below. Available as two-pole or three-pole unit. Booklet includes dimensions and rating charts. (8 pp.)

AIA file no. 31-I-43

MFR: GENERAL ELECTRIC CO.  
Circle 122

### Wiring units

Crouse-Hinds Co. has issued literature describing plugs and receptacles for "environment-resistant" constructions. Mfr states type RPE "ARK-trol" connectors are moisture-proof, shock-insulated, dust-tight and corrosion-resistant. Type RPC circuit-breaking connectors have all features of RPE plus ability to break circuits under full rated load. All connectors meet and exceed the most rigid industrial and military standards, according to mfr, who claims they are resistant to alkalis, strong caustics, acids, petroleum base and organic solvents, operate in a temperature range of

-80°F to +225°F, and withstand pressure of 300 psi external and 200 psi internal. (48 pp.)

AIA file no. 31-C-71

MFR: CROUSE-HINDS CO.

Circle 123

### Circuit breakers

Wood Electric Co. has issued a circuit breaker catalog with convenient arrangement of specifications and construction details. Illustrations and section drawings are included. All equipment carries one year guarantee by the company. (8 pp.)

AIA file no. 31-D-4

MFR: WOOD ELECTRIC CO.  
Circle 124

### HVAC Gas AC units

Gas air conditioning, forced air furnace and hot water heating units are described in current literature of the Bryant Mfg. Co. Designed to fit standard binders, bulletins detail specifications and dimensions of systems in clear section drawings. Product is suited to residential requirements, and equipment is available in both interior and exterior installation models. (22 pp.)

AIA file no. 30-F

MFR: BRYANT MFG. CO.  
Circle 125

### Perforated diffusers

Air Devices, Inc. has published a booklet containing technical information and allied performance data on "Perfair" diffusers and return units. Detailed presentation includes section drawings of sizes and types of units, bar graphs of quantities and requirements of return units, charts of ambient loudness levels for various room enclosures and other performance tables. Information may assist those specifying air diffusers of several types. Installation drawings are presented as well as photographs of actual installations. (18 pp.)

AIA file no. 30-J

MFR: AIR DEVICES, INC.  
Circle 126

### Air conditioning

Techniques for reducing air conditioning tonnage requirements and operating costs are explained in a pamphlet

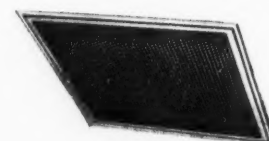


## Circuit Breakers

... performance proved in millions of installations

WOOD ELECTRIC COMPANY 214 BROAD STREET LYNN, MASS.

124



126



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137

released by Reflectal Corp., architectural subs. of Borg-Warner Corp. Written for architects, builders and developers, pamphlet describes effective insulating material and techniques to bring air conditioning within popular view. Mfr claims use of reflective-type insulation can stretch the capacity of cooling units to result in savings of over \$400 in a single home. In addition to tonnage savings, use of multi-layer reflective foil blankets cuts air conditioning operating costs. Included is a precis of findings of the U. S. Bureau of Standards regarding relative effectiveness of various insulating materials in protecting ceilings against summer heat.

AIA file no. 30-F

MFR: REFLECTAL CORP., SUBS. OF  
BORG-WARNER CORP.  
Circle 127

### Heating/air conditioning

Catalog published by Mueller Climatrol, Div. Worthington Corp., describes line of heating and air conditioning units for residential, commercial, industrial and institutional installations. Catalog includes features and specifications on heating, cooling and combination heating-cooling equipment, both gas and forced air types. Insert contains section illustrations on installation and capacity data. (13 pp.)

AIA file no. 30

MFR: MUELLER CLIMATROL, DIV.  
WORTHINGTON CORP.  
Circle 128

### Automatic heating

The American Heating & Ventilating Co. presents in recent literature the "American Amplifier" system a self-contained heating and ventilating machine featuring automatic temperature and ventilation control, for school and institutional uses. Among advantages listed by mfr are adaptability to future cooling installations, elimination of cold floors, maintenance reduction and ventilation without heating for spring and fall seasons. System bears five year guarantee. Also included are assembly diagrams showing typical installations and simplicity of operation. (4 pp.)

AIA file no. 31-K

MFR: AMERICAN HEATING &  
VENTILATING CO.  
Circle 129

### Combination units

Pre-engineered units combining heat-

ing, ventilating and humidifying, of cast iron construction, are featured in recent literature of the American Foundry & Furnace Co. Designed for large capacity installations, units are composed of: "June-Aire" furnace unit accommodating all furnace models; by pass unit with clearances for cooling coil; mixing damper unit; blower unit; filter unit with permanent or disposable filters; pre-wired control panel; and humidifier. Optional unit construction permits rearrangement to fit individual job requirements. Charts contain physical and technical information. (4 pp.)

AIA file no. 30

MFR: AMERICAN FOUNDRY & FURNACE  
CO.  
Circle 130

### Radiant heating

Current literature of the Johnson Service Co. discusses aspects of radiant heating. Types of systems, primary controls, room thermostat controls, and forced ventilation are included, with recommendations of pipe and tubing mfrs and ratio of weather compensation. Booklet is designed as "engineering report" to those interested in application of effective control to radiant heating installations. Graphic illustrations show features and installations of Johnson thermostats, available in immersion and insertion models with interchangeable temperature measuring elements. (20 pp.)

AIA file no. 30-C-44

MFR: JOHNSON SERVICE CO.  
Circle 131

### DOORS/WINDOWS

#### Rolling doors

Current line of Cookson rolling doors and partitions is described in recent catalog. Line includes steel rolling service doors, fire doors, steel and aluminum rolling grilles, extruded aluminum counter doors and wood side-coiling partitions. Closures are illustrated in typical installation with information regarding standard and special situations. Catalog also contains detail sketches and complete architectural specifications. Mfr states included charts will simplify selection of proper gauge and type of slats, guide type, power units and other components. Blueprints of 13 basic door types show all necessary dimensions,

and UL label requirements are outlined. (16 pp.)

AIA file no. 16-D

MFR: THE COOKSON CO.  
Circle 132

### Tracing templates

The Bilco Co. has released a file booklet containing tracing templates, designed as an aid for architects specifying horizontal and spring operated doors. Scaled, detailed drawings are presented, covering horizontally hinged, "spring assisted" doors, roof scuttles, smoke hatches, ceiling access doors and basement doors with steel stair stringers. Outlines of specifications, standard sizes and weights are included.

AIA file no. 12-P

MFR: THE BILCO CO.  
Circle 133

### Doors/store fronts

Two "Amarlite" 1959 catalogs describing entrances and store fronts, combined in single cover, have been released by American Art Metals Co. Text and colored illustrations show types, sizes and models of aluminum entrances and store front units, in addition to wind load charts, architectural specifications, scale drawings of products and charts of extruded aluminum shapes. Catalogs are comprehensive and highly detailed. (40 pp.)

AIA file no. 16-E; 26-D

MFR: AMERICAN ART METALS CO.  
Circle 134

### Doors/windows

Booklet from the Security Cos. illustrates and describes varied applications of combination windows and doors, siding, paneling and awnings of aluminum composition. Tubular construction of product affords torsional rigidity and less porous surface according to mfr. Illustrations and drawings show installations and installation details. (8 pp.)

AIA file no. 16

MFR: THE SECURITY COS.  
Circle 135

### Window assemblies

Booklet detailing types and advantages of "Bilt-Well" casements has been issued by Carr, Adams & Collier Co. Of pine construction, casements feature concealed hinges, double weatherstripping and "unitized" sill

(pat. applied for) which makes possible installation of individual units in continuous lengths, regardless of availability of long sills. Redesigned hinges leave window free of exposed hardware and discourage "breaking in" because of inaccessibility. Included also are light and ventilation tables, construction guide for figuring multiple openings and section drawings explaining installation details and procedures for joining units. (12 pp.)

AIA file no. 16-L

MFR: CARR, ADAMS & COLLIER CO.  
Circle 136

### HARDWARE

#### Drapery hardware

Catalog of drapery hardware has been issued by Stanley-Judd, Div. The Stanley Works. Catalog describes complete line of Stanley-Judd products including "Professional" line of drapery hardware, adjustable traverse rods, corrosion resistant line of I-beam traverse track, professional oval rod-ding and other related products. Product applications illustrated. (52 pp.)

AIA file no. 27-C

MFR: STANLEY-JUDD, DIV. THE  
STANLEY WORKS  
Circle 137

#### Tracks/catches

The Engineered Products Co. offers a bulletin of sliding door tracks, cabinet catches, guides and pulls for sliding glass doors. Hardware is of aluminum construction; catches feature magnet devices in copper or aluminum finishes. Section drawings of installation data are available. (4 pp.)

AIA file no. 27-B

MFR: ENGINEERED PRODUCTS CO.  
Circle 138

#### Door hardware

Door stoppers and holders for school classroom and exit doors, subject to harsh use, are treated in current literature of Glynn-Johnson Corp. Holders are available in both concealed and surface installations, for metal, wood or glass offset, center hung and butt hung doors. Stoppers are available for interior and exterior doors which need not be opened beyond 110°. (4 pp.)

AIA file no. 27-B

MFR: GLYNN-JOHNSON CORP.  
Circle 139



# forecast

(Continued from page 2)

toward curtain wall construction, regardless of materials used, has been the result of constant effort to find a means of reducing building costs and achieving maximum value over a long term. Economic advantages to be gained by avoiding laborious, piece by piece construction, the ability to prefabricate large sections for erection on the site, and the ability to save space by use of effective insulation are all obvious advantages shared equally by other materials used in curtain wall construction.

"When we consider the stainless steel curtain wall and the advantages to be gained from its use, it is rather interesting to note that the principal desirable property, which we have advantageously used, is its durability. In recent years research and development activity in the area of stainless steels has resulted in the availability of alloys having extremely high strength characteristics. Materials used for the outer skin of curtain walls up until the present time have had tensile strengths in the order of magnitude of 90,000 psi. Materials currently available have ultimate strengths ranging up to 300,000 psi achieved by combinations of analytical changes and new or improved processing techniques.

"Along with modifications in chemistry and the processing of the alloys to achieve improved mechanical properties, we are acquiring the mechanical means for producing these materials in greater widths, lengths, and in lighter gauges.

"We are also seeing the development of techniques which should, in the future, permit the effective addition of pigments to other chemical compounds formed on the surface of the base metal, thereby providing a tightly adherent and abrasion-resistant coating. The advantages of stainless steel as the base are apparent in that its inherent resistance to corrosion obviates the necessity for protecting uncoated areas.

"Many dollars are being spent on research and development in the area of stainless steels and other corrosion resistant metals. This work will provide the architect and the design engineer of the future with a high strength durable material capable of assuming a tremendous variety of finishes and colors and capable of being assembly-line fabricated on semi-automatic equipment into structural components which will reduce weight and simplify assembly."

## Copper and brass

Richard M. Stewart, President of the American Brass Company, in speaking before the California Convention of the

Copper and Brass Warehouse Association stated, "Technologically, the products of our industry have always been classified as essential. This is particularly true in periods when the world's economy is expanding as it is today. There are good reasons why copper and its alloys have so often formed the bridge from the inventor's dream to the assembly line of new products. No other commercially available material can claim so many qualities, either singly or in combination. This may sound like a very broad statement, but let's take a look at the reasons why.

The three excellent properties of copper are "electrical conductivity, corrosion resistance and thermal conductivity."

"But in addition, copper and its alloys are friendly metals. They join easily by soldering, brazing or welding; they work well with other metals by plating or alloying and may be formed by virtually any commercial process including spinning, stamping, drawing, forging, machining, swaging, electrical disposition or impact extruding. These qualities, separately or in combination, form the basis why copper has served and will continue to serve as the most versatile giant of the metal industry. . .

"It is only natural that any metal with these qualities should have a steadily growing demand. The industry is aware of the importance of matching growth with increased capacity to assure availability.

"This never-ending growth is being accomplished in two ways—by placing new ore bodies in production and by improved methods of processing which increase the yield of those ores and make possible the use of a grade of ore which once would have been discarded. This growth, looking toward assured availability of copper, has continued steadily.

"I cannot resist mentioning the new age in architecture. There has been gratifyingly increased evidence in the past few years that bronze is recapturing an important position in the eyes of architectural designers. Once again the natural characteristics of our metal—resistance to the elements and an ability to weather beautifully; the ease of forming and joining, and its inherent richness—have combined to make it the choice where permanence and quality of construction are important factors.

"There will be new products and new ideas emerging from our mills and laboratories, and . . . we have every reason to believe that [to] most of our standard lines of production will be added products with combinations of qualities that none of us have yet dreamed of."

## UTILIZING ALUMINUM

(Continued from page 14)

### Anodization

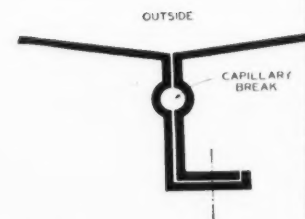
Of great importance in any discussion of finishes for aluminum is the subject of an anodized finish, which is an electrochemical process. This finish produces a hard, smooth, impervious oxide coating on the surface of the metal that increases resistance to weather and abrasion and keeps dirt collection to a minimum. This finish is used for both exterior and interior architectural applications. The coating thus produced is transparent; any change in appearance must be accomplished prior to applying the oxide coating.

It is not enough to merely specify an anodized finish by itself, since it is the *total coating thickness and weight* that determine the degree of weather and abrasion resistance. For this reason, coating thickness and coating weight should be specified and measured by the fabricator and, when necessary, by the architect's inspection to insure compliance with the specifications and maximum quality. For these reasons it is important to be selective in alloy choice to achieve color match between various component parts of the project. For example, a 3003 alloy when anodized may have a very yellow or brownish tint which will not match with a 6063 extrusion given the same treatment.

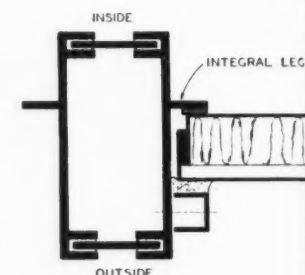
### Colors

*Architectural colors* are available providing a unique finish, electrochemically formed as an integral part of the aluminum surface. Developed for use on unmaintained exterior aluminum, electrochemical color finishes increase weather resistance and have a high degree of color retention and permanency. Reasonably good match of color may be expected when all phases of the recommended procedures are followed. To obtain desired results attention must be given to sheets or extrusions made from special alloys and particular mill practices must be specified.

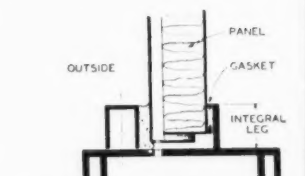
Color can also be achieved through the use of porcelain enamel. As compared with the anodized finish, which is a transparent type coating, the porcelain finishes are opaque. Porcelain resists fading and will sustain cutting, drilling and limited forming without spalling, not possible in the firing of other metals. Since the parent metal is a corrosion resistant metal, no progressive spalling or stains can be expected. The complete color range and the gloss range, as low as 35 degrees to full gloss, make this finish highly desirable. Specially produced alloys assure proper enamel bond and adequate structural properties after firing.



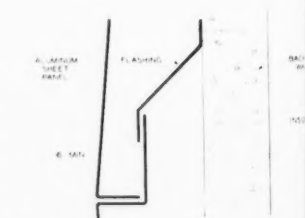
Detail 6



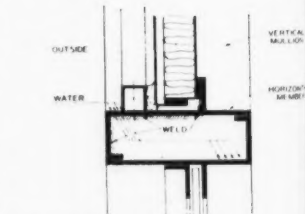
Detail 7



Detail 8



Detail 9



Detail 10

Details of connections and assemblies: Detail 6/horizontal section-typical vertical extruded facing; Detail 7/horizontal mullion section; Detail 8/vertical section at sill; Detail 9/vertical section at panel intersection; Detail 10/vertical section at meeting of horizontal and vertical members.

## books

**Investments for Professional People**, Revised Edition, by Robert U. Cooper, M.D. New York: The MacMillan Co. 1959. 342 pp. \$4.95.

Reviewed by:  
Sigmund Balaban, CPA\*

It is most unusual to find a work in the financial field written by a surgeon. One would ordinarily expect such works to be prepared by professional investment advisors who have been exposed to the problems of the professional man. Dr. Cooper, however, acquits himself extremely well in many fields including financial management of professional practices, income taxes, insurance, banking, real estate and securities.

If one would expect that the presentation of these very complex matters by an M.D. would be superficial or inadequate, one will be surprised to find that if anything the analyses and discussions of these problems in *Investments for Professional People* is so detailed as to be far too technical for the average professional man to absorb. Dr. Cooper, would undoubtedly qualify as an investment advisor in addition to his medical attainments.

For the professional man who is unversed in financial matters, *Investments for Professional People* is an excellent reference work. The title does not really comprehensively explain its contents. The book could be more adequately described as a financial manual for professional people since it covers the handling of funds, from the setting of fees to their ultimate disposition at death.

The technical material is very lucidly presented. Some chapters such as the ones on income taxation and disposition of estates could possibly have been considerably shortened because, while they are written in considerable detail, the problems which they attempt to cover are so complex

(Continued on page 39)

\*Mr. Balaban, CPA, is in private practice heading his internationally-active accountancy firm, Sigmund Balaban & Co. of New York City. Well known as a tax authority and management consultant, he is a contributor to professional journals in his field.

## names

### EDWARD DURELL STONE, FAIA

*Très formidable!* This may very well describe the architect originally from Arkansas who has traveled far, wide and handsome to become one of America's best known contemporary practitioners.

Edward Durell Stone, FAIA, who will keynote the 1959 annual convention of the American Institute of Architects at New Orleans, is a bit of a keynote himself. Stone has emerged on the international scene as an American architect of great gift and individuality. His work, in capturing the imagination of the lay public, has engendered an awareness and a renewed interest in the architect as a professional and in the profession of architecture. Stone's buildings, notably the United States Embassy at New Delhi and the United States Pavilion at the Brussels Fair, serve as virtuosi vehicles which convey the visual drama and the new dimension of contemporary architectural aesthetics.

Born in Fayetteville, Arkansas, a little over 57 years ago, Stone received his education at the University of Arkansas, Harvard University, MIT, and a Doctorate in Fine Arts from the University of Arkansas. In addition he has been the recipient of two noteworthy scholarships, the Harvard Special Study Scholarship and the Rotch Travel Scholarship.

He has also been an educator at Yale University, New York University, Princeton University and the University of Arkansas.

Stone has received an impressive list of medals and other professional honors for his work from the Architectural League of New York and the American Institute of Architects. In 1958, he was elected to the National Institute of Arts and Letters.

His first important commission was the famed Museum of Modern Art in New York City in 1937. This building served as a milestone in the establishment of the International Style in this country, thus marking Stone as a pioneer American architect of this movement.

Stone interrupted his professional career during World War II to enlist in the Army Air Forces and served until the end of the war with the rank of Major.

In the post war years, his next critically important architectural commission began with the *El Panama Hotel* in Panama City in 1951. From that time forward, there has been a succession of exciting building commissions ranging from embassy buildings, libraries, hospitals, medical centers and art galleries to the International Trade Mart for New Orleans scheduled for completion in 1962.

Stone has traveled in over 40 countries, touching every continent in the world. With this broad view in mind, he will offer to the AIA convention his thoughts on the need for a continuing heritage in American architecture. This, Stone believes, is necessary in order that future generations will enjoy the values of our culture. To answer this need, he calls for "guardians of the physical destiny of our country."

"... we should have a cabinet official—in a foreign country he would be called Minister of Culture; here this might be suspect, so I suggest we call him Secretary of Environment. In the lower echelon, a counterpart should exist in each state capital and in each principal city," he concludes.

A rather intriguing idea, Dr. Stone, and we think that world-traveler, scholar, educator, architect Stone would make an excellent first Secretary of Environment.

Karsh/Ottawa



# abstracts

## Architectural expression

*Remarks of John Noble Richards, FAIA, President of the American Institute of Architects, from recent Inter-American Symposium sponsored by Owens-Corning Fiberglas Corp.*

"In recent years it has become increasingly difficult to judge from its appearance the geographic location of a modern building. Indeed there is often little to give a clue as to its function. Hospitals and schools, town-halls and office buildings present the same non-committal facades in Tokyo, London, Stockholm, in Sao Paulo, in Chicago. These facades and the structural systems behind them seem to express the 20th Century and its modern technology.

"In the revolt against the serene cubes of glass and metal we see two recent and sometimes related developments. One school exploits shells and other structural elements to create sometimes novel and occasionally expressive forms. Another school follows the plastic expressions of Gaudi, Mendelsohn, and Corbu's Ronchamp. While these efforts bring results that differ from the glass-cube school, they differ little from each other. Thin shells may be conceived in Copenhagen for execution in Sydney. Similar sculptural expressions in architecture may appear in very dissimilar cultures and places.

"The similarities in our architectural expressions are often a result of modern communications, and a world made much smaller by our 20th Century technology. Countries and localities still have unique personalities and a flavor that can and should be expressed in the local contemporary architecture. Architecture does have a symbolic function which should reflect something peculiar and special within the local culture."

## Retained percentages

*From an address by Edmund R. Purves, FAIA, Executive Director of the American Institute of Architects, to the 21st annual convention of the National Assn. of Architectural Metal Manufacturers, April 17, 1959, New Orleans.*

"... you have given me three key questions—first, why is The American

Institute of Architects unable to recommend unified action? Second, why does the architect not take an active interest in the problem of retained percentages? Third, what is the best way to obtain the support of the architectural profession in solving the problems arising from the implementation of retained percentages? ...

"... I would like to change the order and explore the second question first—why does an architect not take an active interest in the problem? The answer to that may be given in terms of psychology, philosophy, economy, or even in aesthetic terms. The fundamental answer is contained in the question itself. Why should an architect take an active interest in retained percentages? ... An architect is a composite individual. To define the term "composite individual" is baffling. The obligations of an architect are certainly composite and notoriously complex—increasingly so, in fact, from year to year. His job is manifold. There is no simple charge. The day has long since passed when any but the most unique individual can furnish all of the obligations of the architect in one person. Even those rare individuals who have seemingly the ability to include all the talents, experience and ability necessary to produce a complete one man service, find that they are not able to engage on any work but that of a relatively minor and simple variety.

"An architect too is very much influenced by local conditions and local customs. In The American Institute of Architects we advocate that structures be designed by the architects available in the region if competent professionals are to be found. In this country today there are few parts where good architectural service is not available within a reasonable distance. Therefore, in a matter like retained percentages the architect is likely to regard that the custom of the region is the governing factor. He does not feel it is his obligation to govern.

"Again it must be borne in mind that he is affected by retained percentages even to a less degree than he is affected by building codes and other regulations. The charge is often made that architects should take a more active interest in the unification of build-

ing codes, standardization, or whatever you want to call it and, in fact, do anything to relieve the ridiculous situation of some 2,500 different building codes in the United States. This is indeed a deplorable condition which gains the architect's ear and sympathy, but it does not affect him too greatly as an architect for he is used to dealing with and designing within the framework of the regulations of the locality ...

"Your third question I place second. 'Why is The American Institute of Architects unable to recommend unified action?' That is a far more simple question to answer. The governing body of The American Institute of Architects is its Convention, which assembles architects from all over the United States, from a great variety of economic, geographical and building code backgrounds. Theoretically, the convention is a policy-forming body. Actually our convention could no more formulate policy of The American Institute of Architects than can any other convention formulate policy. Policy recommendations come from a variety of sources as they do, I imagine, in every organization. So that the policy determining factor of The American Institute of Architects is its Board of Directors, and our Board is made up, as I imagine yours is too, of representatives from thirteen different regions, supplemented by five elected Officers, again generally coming from different parts of the country. Although there is a unanimity of objective for general advancement, when it comes to questions such as retained percentages, each member of our Board is used to working in his particular area under various conditions, so each adheres automatically to the custom of his area and to the habits of his practice.

"Architects are human beings, men of talent and ability caught up in a complex economy which thrusts a multitude of responsibilities on their shoulders. It is little wonder that a matter not of immediate concern to them fails to stir them to action. They are not unsympathetic to your problem, but they simply do not see that it is their concern ... You asked me a question, I have given you the answer as I now know it."

# documents

**Superintendent of Documents, U. S. Department of Commerce, National Bureau of Standards, Washington 25, D.C.**

**Sound Insulation of Wall, Floor and Door Constructions, 13 pp., \$1.10.**

Supplement to NBS Report 144. Accuracy of former figures is discussed, and details given for new average figure called Energy Average, for over-all sound insulation of a panel.

**Selected Bibliography on Building Construction and Maintenance, NBS report 140, 30 pp., \$1.30.**

Gives sources of information concerning building construction and maintenance, titles of papers dealing with practical aspects of building construction and technical publications.

**Research Highlights of the National Bureau of Standards, Annual Report, 1958, NBS publication 226, 138 pp., \$1.45.**

Describes range of scientific studies, laboratory experiments, instrument developments and technical publications for fiscal 1958.

**New Housing and its Materials 1940-56, BLS Bulletin 1231, 64 pp., \$1.40.**

**Wood Handbook, A1-76-72, 528 pp., \$2.00.**

Concentrates on wood as construction material and design and specification data.

**Wood—Colors and Kinds, A1-76-101, 36 pp., \$1.50.**

Contains descriptions, range, properties, illustrations and principal uses for 18 hardwoods and 14 softwoods.

**The Fatigue of Metals and Structures, K202-2-M56, 399 pp., \$1.75.**

Aimed at designers and engineers with limited practical experience in fatigue problems, book summarizes present day information and provides reference to published literature.



# books

(Continued from page 37)

that even the lengthy presentation is inadequate. "A little knowledge is a dangerous thing." It would seem that such problems when encountered by the average professional man would be better left to explanation by the experts in those fields. Possibly, however, even this has its benefits since while giving him the background to discuss his problem in an informed manner, it may well convince the reader that he had better consult his professional advisor.

The book is recommended as a reference work for the professional man in the management of his financial affairs.

## Engineering

**Reliable Electrical Connections 1958:** *Third EIA Conference on reliable connections, Dallas, Tex., by Electronic Industries Assn. New York: Engineering Publishers, 1958. 286 pp., illus. \$7.75.*

**Marks' Mechanical Engineers' Handbook,** *Sixth Edition edited by Theodore Baumeister. New York: McGraw-Hill Book Co., Inc., 1958. 2,242 pp., illus., \$23.50.*

**Elasticity and Plasticity** by J. N. Goddier and P. G. Hodge, Jr., *New York: John Wiley and Sons, Inc., 1958. 152 pp., illus. \$6.25.*

**Laminated Plastics; Including High-Pressure and Low-Pressure Types and Reinforced Plastics** by D. J. Duffin. *New York: Reinhold Publishing Corp., 1958. 254 pp. illus. \$5.75.*

Semi-technical in character book is intended for design engineers and others in plastics industry. Contains chemistry and properties of resins, base materials and reinforcements, manufacturing processes, high pressure laminates, applications, etc.

**Advanced Mechanics of Fluids** edited by Hunter Rouse. *New York: John Wiley & Sons, Inc., 1959. 458 pp. \$9.75.*

## MASONRY ANCHORING METHODS

*A critically important element in modern construction is the problem of the selection of appropriate anchoring methods or devices for masonry. A/E NEWS presents a digest of a paper presented by F. A. Werstein, Vice President of the Phillips Drill Co., Michigan City, Ind., at the Annual Meeting of the Building Research Institute in Pittsburgh, Pa., April 7, 1959.*

### ROLE OF ANCHORS

Masonry anchoring devices or methods for securing things to concrete, brick, stone, or plaster constitute a critically important element in all modern construction. Any building job reveals the importance of masonry anchors. Ordinary buildings commonly require thousands of anchors of various types in the course of construction. Concrete anchors are the mainstay in securing practically everything that must be fastened to the concrete skeleton of the building. Pipes, sprinkler systems, curtain walls, suspended ceilings—just to name several of the scores of vital applications.

The technical characteristics of anchors must be established by scientific methods and promotional claims must be supported by unbiased laboratory data. It is time that the anchor manufacturing industry took the initiative to develop the kind of technical data so urgently required to keep abreast of new developments in the building industry.

### HISTORY OF ANCHORS

Anchoring to masonry has been a problem since building first began. By various methods and devices objects were attached to the stone and masonry of the Pyramids, the Great Wall of China and the castles of Medieval Europe. It can be surmised that more primitive inventors even found ways for anchoring objects to the stone walls of cave dwellings. Malleable metal spikes have their modern counterpart in the so-called masonry nail. The common method through the centuries involved the use of a metal rod and molten lead, or molten sulfur, or cement as a binding agent. This age-old method, still in wide use today, has obvious limitations as to holding power and convenience of installation.

### TWO METHODS

As concrete became increasingly prominent in major construction, two essentially different methods of anchoring were developed. The first method involves pre-set inserts set in concrete at the time of pouring. The second method involves installation of anchoring devices in existing concrete or other masonry. Mastics and adhesives are also used to attach objects to concrete and other masonry surfaces, but since these are not fasteners or anchors in the mechanical sense, they are not included.

### PRE-SETTING DEVICES

The simplest and most used form is the traditional "L" shaped metal rod with a threaded end. Another general type is the embedded metal box to which a rod or bolt can be subsequently attached or threaded. Their utility depends upon being placed exactly where needed, and staying precisely in position while the concrete is poured and is setting. In this same family of inserts is the slotted metal channel type. This type permits placement and adjustment of one or more anchors along the length of the channel.

Pre-set bolt inserts can be given almost any design and it is obviously possible to design them to provide great holding power. However, the subject has not been standardized from an engineering viewpoint,

and adequate standards, specifications, and holding power data are not available.

Against the potentially high holding power of a properly designed pre-set insert there are certain serious drawbacks. For example, they do not favor precision alignment which has proven a problem in many installations, such as the multi-directional adjustments required in panel wall construction.

A number of other drawbacks are also characteristic of this method. The location of each insert must be predetermined in advance of construction. Insert placement and alignment, and engineering liaison consume costly labor time. Costly templates are usually required for correct installation. They make concrete form work more complicated and expensive. Unless skillfully set, they may be inaccurately placed and can be easily displaced before concrete is poured. They cannot be altered or adjusted, and they do not allow for design changes during construction.

While the concrete insert is practical for installation at the time concrete is being poured—other devices and techniques for masonry anchoring are needed by the construction industry which will permit a simple, convenient, economical, and dependable means of fastening.

### EXISTING MASONRY ANCHORS

There are two basic techniques for installing anchors in existing masonry. One basic technique involves an explosive powder-actuated device. This device "shoots" the anchor into the concrete, eliminating the need for a pre-drilled hole. The second basic technique includes the various anchoring devices and methods which require a pre-drilled hole.

### POWDER-ACTUATED TECHNIQUE

The powder-actuated device employs an explosive powder charge in a gun-like special tool to literally shoot a metal stud into the masonry. This method was developed during World War II for emergency repair of ocean vessels. The technique of shooting a stud into steel was subsequently adapted to concrete and thus provided a mode of concrete anchoring which has been widely used in various construction applications during the last two decades. Devices have been recently developed for the manual installation of studs of this type.

Aside from the obvious training and safety educational requirements associated with this method, a notable advantage of the powder-actuated method is that it eliminates the laborious process of drilling a hole in concrete. Anchors installed in this manner derive their holding power from the compression of the concrete. The method is limited, however, to anchor studs of small diameter. There are also some forms of masonry, including concrete containing very hard aggregate, concrete blocks, and pre-stressed concrete members where powder-actuated anchoring methods are apt to run into serious difficulties.

A few of the applications for this method of anchoring include: wood furring and sleepers; wire mesh

# digest: 6

and metal lathe; electrical conduit straps and hangers; electrical junction and switch boxes; door bucks; supports for under-floor electrical distribution systems; temporary fences or barricades; installation for door bucks and window frames; and movable partitions.

## PRE-DRILLING METHODS

Anchoring devices requiring pre-drilled holes involve the use of ordinary hand tools such as hammers and drills or portable power tools such as the electric drills and impact hammers commonly found on all construction jobs or in tool cribs. The great majority of anchors used today consist of variations of this type. It is this broad group which deserves considerable interest and attention.

The revolution in anchoring methods came with the invention of the expansion principle at the turn of the century. The patent on the first expansion bolt was granted shortly before 1900. Since then, a considerable number of ingenious variations and improvements have been brought forward, leaving many types to choose from. *This fact underlines the need for specifications based upon uniform standards.* While there is a wide variety of designs and trade names, the majority of anchors using the expansion principle can be logically classified into the following basic groups: (1) ductile sleeve lead anchors; (2) sleeve and pin anchors; (3) shield and wedge anchors; (4) hollow wall fasteners; (5) self-drilling anchors; and spring drive bolts.

## DUCTILE SLEEVE LEAD ANCHORS

Ductile sleeve lead anchors have been most familiar to generations of building tradesmen. They have a lead sleeve which is expanded by a wedging action to provide a locking grip against the inner surface of a pre-drilled hole. In the common lead expansion bolt or stud, the lead sleeve is expanded over a conical wedge by a caulking tool. In most anchors of this type, full expansion is obtained by drawing up the conical wedge with the threaded bolt or stud member of the anchor. They are available either as single or multiple expansion units. Closely related to the family of lead anchors are the familiar lag screws with the combination fiber lead sleeves, and the screw anchors with plastic or nylon sleeves. Prior to the general acceptance and use of the powder-actuated anchors and the self-drilling expansion shields, lead anchors of one kind or another were the most common anchoring device used for construction and maintenance. In the installation of lead anchors, the human element is an important consideration since load carrying capacity depends greatly on the precision and care exercised in drilling the hole.

## SLEEVE AND PIN TYPES

The second broad class of anchors are the sleeve and pin types which also require a pre-drilled hole. A metal sleeve is fitted into the hole and expanded by forcing a metal pin into the sleeve opening. This type, which is generally considered light duty, includes: (1) aluminum expansion nail anchors; (2) steel and lead expansion anchors; (3) spiral drive nail anchors; (4) pin bolt drives; (5) rivet pin drives; and (7) the familiar fiber types.

## SHIELD AND WEDGE ANCHORS

Split shield and wedge anchors constitute the third main group of masonry anchors requiring pre-drilled holes. They produce a locking action by simple wedging. No tamping or caulking is required. The anchor

usually consists of two hinged or connected half-shells which are spread apart to grip the inner surface of the hole when the lag bolt or the cone-shaped end of the machine bolt is drawn up.

## HOLLOW WALL FASTENERS

Hollow wall fasteners are an important class of light duty masonry anchors and are exemplified by the familiar toggle bolts. The device is passed through a pre-drilled hole in the wall; its design permits the spreading of part of the anchor to hook against the back of the wall.

## EXPANSION SHIELD ANCHORS

The last important type in this group requiring a pre-drilled hole is the self-drilling expansion shield anchor. This type of anchor is also an expendable masonry drill which drills its own hole. By so doing, it dispenses with the need for conventional masonry drills. This unique self-drilling anchor employs the principle of a "hollow-drill." The hollow feature of this anchor plus the exterior broaching grooves make it possible to drill a close-fitting hole. After drilling is completed, a case hardened conical steel plug is placed in the cutting end of the drill. The drill is then replaced in the hole and expanded. This method actually undercuts the bottom of the hole to achieve its holding power. Although it is a technique which is almost a half-century old, it has only been with the application of power impact tools that the self-drilling anchor has emerged as one of the newest methods available to the construction industry today. While this type has broad applications, it is not suitable for use with hollow tile, cinder block, or extremely shallow concrete.

Now that we have had a quick over-all look at the general types and methods of concrete anchoring—let's turn again to the problem of inadequate technical information on these anchors and their applications.

## INADEQUATE DATA

When selecting the proper anchor one can be guided by common sense and experience as to the right anchor and size to carry a particular load under pre-determined conditions. However, selection should be predicated on accepted technical data made available to the construction industry. Adequate test data can eliminate serious and unnecessary structural headaches and failures. What data is available today is often unqualified, incomplete, and antiquated.

Close liaison between the anchor manufacturers, the architects, engineers, and manufacturers of building materials is essential to determine what kind of technical information and what system of standards will best serve the needs of the design groups for specifying the best anchor for any given application.

## CRITERIA

An important step would be the establishment of criteria for conducting uniform meaningful tests which would have to take into account such variables as: (1) psi of concrete; (2) tensile strength of bolts used; (3) effects of vibration; (4) effects of static loads; (5) composition of concrete; (6) effects of electrolysis; (7) variation in climate; (8) effects of concrete shrinkage or expansion; and (9) temperature variations.

Further, a complete set of ground rules would have to be established as a basis for conducting these tests with the assurance that all data was obtained under controlled conditions and related to field practice.

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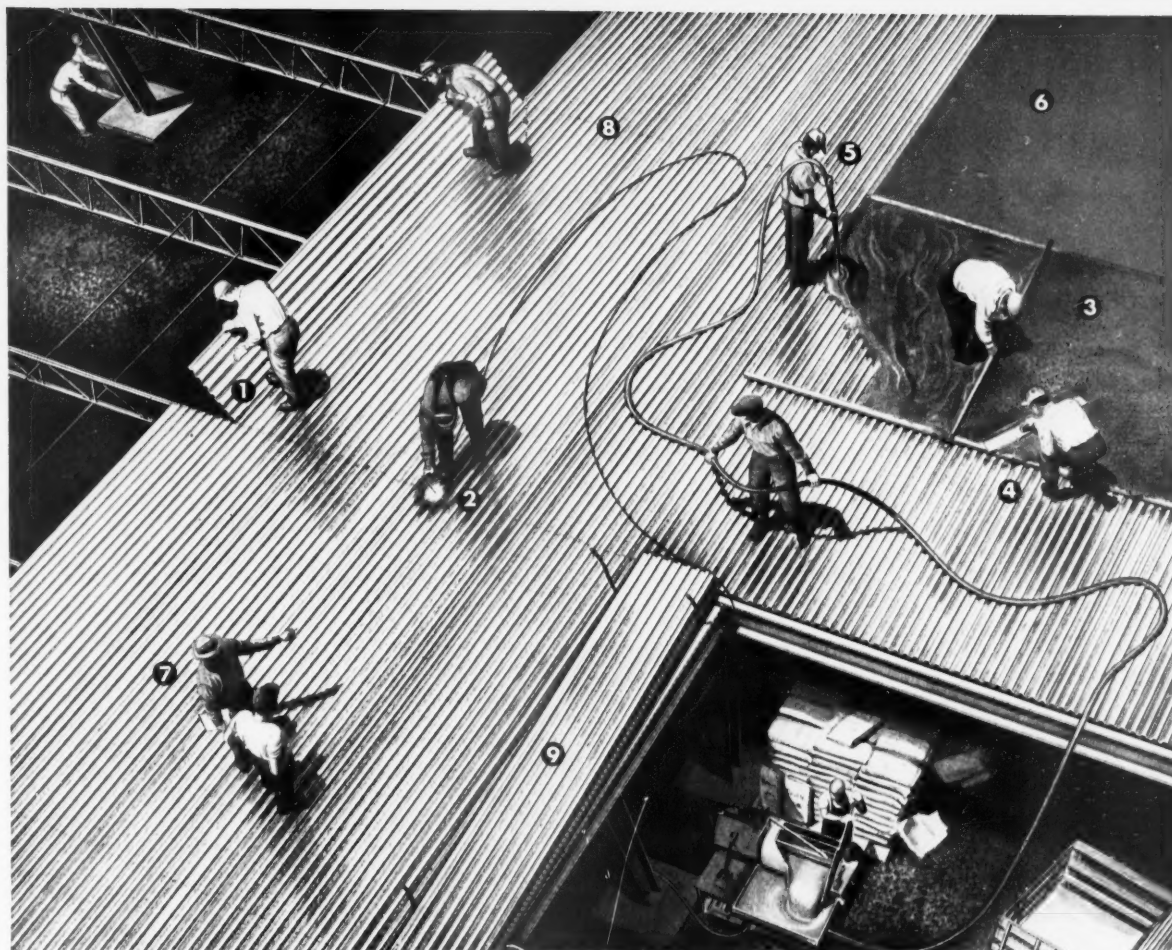
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# calendar

- June 9** **FORM GIVERS AT MID-CENTURY:** comprehensive exhibition defining role played by 13 leading architects. Sponsored by *Time* magazine, showing at Metropolitan Museum of Art, New York City during summer through Sept. 6. National tour to follow.
- 21-26** **AMERICAN SOC FOR TESTING MATERIALS:** annual meeting Chalfonte-Haddon Hall, Atlantic City, N. J.
- 22-23** **ILLUMINATING ENGR SOC:** Great Lakes regional meeting, Statler Hotel, Buffalo, N. Y.
- 22-24** **AMERICAN SOC OF REFRIGERATING ENGRS:** annual meeting, Lake Placid Club, Lake Placid, N. Y.
- 22-26** **AMERICAN INST OF ARCHITECTS:** annual convention with design theme, New Orleans, La.
- 22-26** **AMERICAN SOC FOR ENGR EDUCATION AND ASTM:** joint symposium on education in materials, Atlantic City, N. J.
- 24-25** **ASPHALT INST:** mid-year meeting, Hotel del Coronado, San Diego, Calif.
- Aug. 9-12** **AMERICAN SOC OF MECHANICAL ENGRS:** heat transfer conference, Univ. of Conn., Storrs, Conn.
- Sept. 7-11** **ILLUMINATING ENGR SOC:** national technical conference, Hotels Fairmont and Mark Hopkins, San Francisco, Calif.
- 10-11** **AMERICAN SOC OF MECHANICAL ENGRS:** wood industries conference, Multnomah Hotel, Portland, Ore.
- 27-30** **AMERICAN INST OF CHEMICAL ENGRS:** St. Paul Hotel, St. Paul, Minn.
- Oct. 5-30** **INTER - AMERICAN HOUSING AND PLANNING CENTER OF THE ORGANIZATION OF AMERICAN STATES:** seminar on urban planning, Bogota, Colombia, S. A.
- Oct. 22-23** **ILLINOIS INSTITUTE OF TECHNOLOGY AND ARMOUR RESEARCH FOUNDATION:** 15th annual national conference on industrial hydraulics, Hotel Sherman, Chicago, Ill.
- Nov. 3-5** **AMERICAN CONCRETE INST:** 12th regional meeting, Continental Hilton Hotel and Hotel Del Prado, Mexico City, Mexico.



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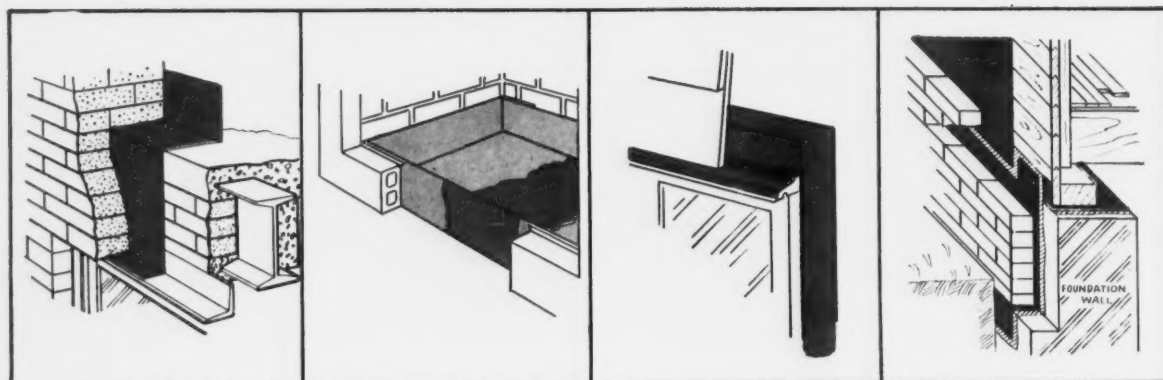
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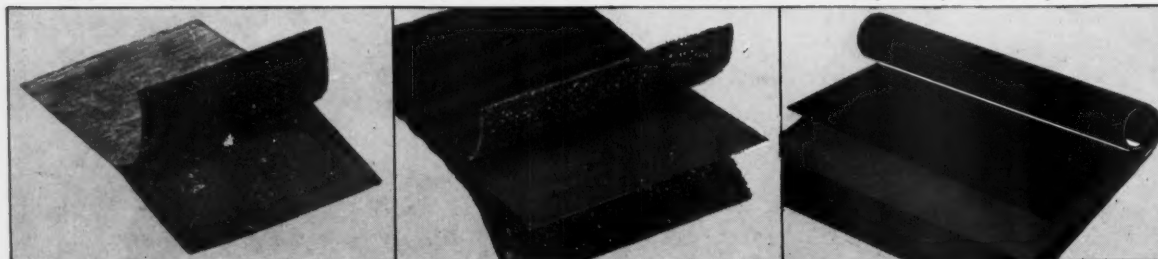
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